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COMPULSIVE FEATURES IN A PATIENT WITH LEBER'S DISEASE

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ALTHOUGH reports of cases of Leber's disease (hereditary optic atrophy) have been published by British, French, and German authors, very few such reports are to be found in the American literature. The unusual findings of neurotic manifestations of a compulsive nature in a female patient with this disease appears to justify their presentation.

Julia Bell (1931) has made an extensive study of the literature on the subject of Leber's disease and quotes the works of Beer (1817), Von Graefe (1858), and Leber (1871). Leber's disease usually begins at puberty or in early youth and is characterized by a rapid loss of vision, contraction of the visual fields, central scotomata and primary optic atrophy. Slight improvement may follow the primary loss of vision.

Case Report

E.B., a 32-year-old married Jewish housewife, was admitted to the Bellevue Psychiatric Hospital on 5th January, 1936. She had been referred for mental observation from the Bellevue Mental Hygiene Clinic, as she was said to have a compulsive neurosis, optic atrophy, and suicidal tendencies. She was born in New York City of Russian Jewish parents, and graduated from a grammar school at the age of fifteen years. At that time on the Stanford Binet tests she was rated as of dull normal intelligence with a mental age of twelve years and two months. Except for doing office work for a few months, she remained at home caring for her mother until the time of her marriage at the age of nineteen.

The past history was essentially negative except for diphtheria at the age of nine

or ten. The birth and early developmental history were negative. There was no history of convulsions nor of neurotic traits in childhood. Her menstrual periods had been regular since their onset at the age of fifteen years.

The patient's eye symptoms began suddenly in July, 1923, at the age of nineteen, one month after her marriage, when she suddenly lost her vision almost completely and it was noted she developed strabismus. The patient had been having a few headaches previously and had a " cold." The patient said that she went to bed one night feeling well. On waking the following morning her vision was impaired. Everything appeared " in a fog." During the course of the day the vision became progressively worse and continued to do so for three or four weeks, when some slight improvement set in. During this period the strabismus developed. A year after the onset some further slight improvement followed an operation on a nasal sinus.

The patient had been under the care of Dr. Mark J. Schoenberg intermittently since 1924. He reported that in 1924, when he first examined her, she had bilateral optic atrophy of several months' duration and her acuity of vision was reduced to counting fingers at two feet in each eye. In 1934 the visual fields showed a binasal defect, almost hemianopic, and included the central portion of the fields. In September, 1935, the vision was 1/70 (O.D.) and 1/200 (O.S.). There was a central opacity of the lens in the right eye. No mention was made of the existence of the cataract in 1924 or 1934. Apart from the " cold " there was nothing to suggest a " toxic " basis for the eye disturbance. Signs of increased intracranial pressure were also absent.

The neurotic symptoms began about July, 1934. The patient described her symptoms as follows : " I'm nervous about a year and a half. At the beginning I used to linger over things. If I did something I would stand over it and see to it that it wasn't wrong. I would try to make sure. I would repeat it over and over. I did the same thing three or four times. I can't control myself. I mumble to myself and talk to myself. I think too much of myself . . . I started touching my nose and eyes, and then I would see if the floor was clean and I would go over that three or four times. Then I would wipe the dishes and I would wipe them over and over again. I then would see if my clothes were fixed straight and I'd pull and straighten them over and over. Then I'd look to see if anything was lying around and I'd go back to be sure . . . I wasn't sure of my eyes so I would go back and do the same things over and over again. I couldn't see very well and I wanted things to be clean, so I would dust and dust over and over to make sure. . . . I'm disgusted with life and want to die. I get practically no enjoyment from sex life. I'm still afraid to get pregnant. I'm not a fit person to have children. If I had money I'd get an operation just to be sure I'd never get pregnant."

Examination.—The general physical examination was essentially negative except for the signs of pregnancy of three months' duration. Smell was normal. There was a divergent squint. The right pupil was slightly larger than the left ; both reacted promptly to light and on accommodation. There was a right posterior polar cataract and bilateral primary optic atrophy. Visual field examination showed slight nasal constriction in the left eye, but these tests were unsatisfactory owing to the large size of test objects necessary. A definite central scotoma was present on the left side. The patient was colour-blind. The right iris had less pigment than the left. There was no nystagmus. Corneal and nasal reflexes were active and equal. Hearing was normal. The deep and superficial reflexes were normal. There were no signs of ataxia or dysmetria, nor any loss of associated movements in walking. X-ray and laboratory findings, including blood, spinal fluid, and urine studies, were essentially negative.

Behaviour under Observation.—At the time of her admission she was tense, restless, agitated, and admitted suicidal tendencies. She showed constant repetition of certain

movements, such as tugging at her clothes, rubbing her eyes, or picking her nose. She would repeatedly grunt and mumble to herself. She would cry frequently. At times she showed choreiform movements. She had difficulty in sleeping at first and required sedatives. After a few days she began to improve and gradually she had fewer and fewer compulsions. The psychotherapy given her consisted mainly in suggestion and reassurance, together with assistance in altering the environmental factors, particularly with regard to the amount of housework she had to do. She was referred to a birth-control clinic for contraceptive advice. She was discharged to her husband's custody on 18th January, 1936, and then was followed in the Mental Hygiene Clinic. In June she gave birth to a normal full-term baby. She has continued to show improvement.

When she was examined on September 4th, 1936, she said : " I had a baby three months ago. Now I can do some of my housework. I can take care of my baby, dress, and feed him. I do the shopping and the cooking. Before, I didn't have the patience or desire to do any of the work. Now the day goes by fast and I sleep well. I've made up my mind that nothing is going to bother me. I no longer moan and groan. Once in a while I catch myself beginning to do things, as straightening something out. Then I make up my mind and it doesn't bother me."

Family History.—The patient is the fourth oldest of five siblings. The father, aged sixty-eight, is still alive. He works as a presser in a shop. He has had no eye symptoms. The mother was an invalid for seventeen years, prior to her death in 1935. She apparently had a cerebral accident with hemiplegia. The oldest sibling has similar eye trouble. Two other brothers and a sister are free of eye trouble and of any other neurological or psychiatric disorders. Two maternal male cousins were described as having " eye trouble " similar to those of the patient and her brother. Their visual disturbances have been present for many years. No details were elicited and the men were not available for examination.

The patient's brother, B.R., aged thirty-eight years, had a sudden loss of vision in 1929 at the age of thirty-one. He said that he lost his vision suddenly. He observed that his eyesight, previously excellent, suddenly became blurred at the movies. On leaving the movies he mentioned that he suffered from misty vision and was unable to read. These symptoms lasted for fourteen days, and then improved a little. For one and a half years he could not recognize colours, but improvement has taken place. Physical and neurological examinations were completely negative, except in the eyes. There was bilateral primary optic atrophy ; the discs were more blue than those of his sister. There was bilateral concentric constriction of the visual fields. No central scotomata were present, although there was a relative scotoma for colour bilaterally. At a distance of 1 metre he was unable, using his left eye, to name various coloured test objects accurately if they were less than 6 mm. in diameter. With the right eye he could not detect coloured objects less than 2 cm. in size. A few nystagmoid jerks could be elicited. The patient had weakness of ocular convergence. The pupils were slightly irregular, but reacted promptly. The remaining cranial nerves were negative. The deep and superficial reflexes were intact. Laboratory studies were negative. This patient had no neurotic symptoms. His sexual power was intact. He was employed as a plumber's helper and as a petrol station attendant prior to his illness. He appeared to be of average intelligence.

Discussion

Although it is a well-accepted fact that neurotic symptoms may occur in organic diseases of the nervous system, I have been unable to find case reports of obsessive or compulsive neurotic symptoms in persons with Leber's disease.

Schilder (1929), in his article on " The Somatic Basis of the Neurosis," says : " . . . of course every neurosis must have an organic basis, because normal life, normal psychic life, also has an organic background and one cannot make a distinction between the organic and the psychic." Jelliffe (1932) and Schilder (1931) describe compulsive and obsessive features in post-encephalitic patients and discuss regressive tendencies resulting from the discase. Jelliffe describes one post-encephalitic patient who had the compulsion to count letters and another who had a compulsion to think of dirty things. He also emphasizes the symptom of anxiety in his cases. Bender (1935) describes a patient with compulsive thoughts of a sexual nature who had an obscure encephalitic-like illness three years earlier and had some neurological signs, including tremors, flattening of facies, loss of associated movements, and hyper-reflexia. Schilder, in a personal communication, describes a patient he once treated who had bilateral congenital cataract and who, after several operations, developed obsessional trends in connection with his defective vision in which he worried if there were not a spot on his tie or whether he had enough of a shave.

Stengel (1935) in a recent article summarizes most of the literature dealing with the problems of obsessive and compulsive phenomena in organic brain diseases from a psychoanalytical viewpoint. He discusses disturbances of the Ego in cases of epilepsy, in hemichorea following encephalitis, and in oculogyric crises in Parkinsonism. He describes one epileptic patient who had the compulsive idea concerning why the letter " o " should be round, how letter-writing originated, and what would happen if the patient were three thousand years old. Other patients showed compulsive thoughts with open sadistic and masochistic ideas, such as dealing with the thought of killing the father, etc. He also emphasizes the work of Stern in connection with oculogyric crises (Jelliffe, 1932), and the works of Burger and Mayer-Gross (1928). Stengel elaborates the idea that the patient's Ego satisfactions are limited by organic brain disease which impairs the normal sensory or motility functions. He infers that the compulsive or other neurotic symptoms are based on this mechanism rather than on the structural organic defect.

It is worthy of note here that our patient describes herself as always being unusually neat, clean, orderly, always wanting things properly arranged, etc. As a result of her visual impairment she can no longer verify the neatness or orderliness of her appearance, her clothes, or her household goods. As a result she begins to repeat certain rituals, such as the arrangement of her dress, the dusting of a chair or table until a neurotic syndrome develops in which she must repeat these acts over and over. The fact that her symptoms receded quite rapidly under moderate psychotherapy tends, in my opinion, to indicate a more favourable prognosis here than in the usual neuroses growing out of the infantile situation. The prognosis for the neurosis arising in patients with post-encephalitis has been shown by Bender to be less amenable to psychotherapy than the usual neuroses ; this would not, however, apply to neuroses associated with other somatic diseases.

It must be recognized that the relationship between the organic disease and the neurotic syndrome in this woman is probably not the same as that between

the organic brain disease and the neurotic symptoms in the cases described by Jelliffe, Schilder, Bender, and Stengel, although Jelliffe does make the point that the neurotic behaviour is an expression of the individual's (Ego's) inability to cope with the insult to the personality as a whole. It is probably fair to assume that there is no definite organic relation between the ocular pathology and the neurotic picture in this woman unless one assumes that the compulsive syndrome is an evidence of neuropathic weakness in a woman who has a constitutional disease in another part of the nervous system. It is easier to understand her symptoms in the light of her emotional conflicts. It cannot be insignificant that the compulsive, obsessional, and depressive features of her illness reached their height in the third month of pregnancy. Other points which are significant are that her husband states that she is frigid and often refuses sex relations and she has induced two miscarriages. The beginning and the progress of her symptoms are best understood in the light of her disease and the handicap it forces upon her and her resulting struggle to fulfil her duties as a wife and mother. The compulsions start with the tendency to touch her eyes and nose. She then has the compulsion to clean things over and over because she cannot trust her eyes. Then, because of her poor vision, she never has the satisfaction of seeing anything looking clean and immaculate. Everything always looks dirty. Even now that she is essentially free of her compulsions she says that it is the spots before her eyes that make everything look dirty. Then she works from seven in the morning to midnight trying to do her duty by her home, her children, her husband, and her sick mother. She is never satisfied. It is likely that a deep-seated feeling of inadequacy and guilt forces her to such work. We can postulate that this woman sees herself faced with three alternatives. She must refuse sex relations to her husband and fail as a wife, and we do not know with what grace the husband accepts this ; or she must see herself develop a pregnancy of which she is in constant dread ; or she must induce abortions, as she has done twice already. She was persuaded to enter the hospital at the time she contemplated suicide in the third month of pregnancy and there became reconciled to the pregnancy ; this was probably an important factor in the good results from the psychotherapy that was given her. The conflicts are temporarily resolved, although from time to time even yet she recognizes the slight tendency for the familiar compulsions to recur. Her brother is happily saved from these many conflicts.

Summary

A case is described of a female patient having the classical symptoms of Leber's disease. In addition, she had symptoms of a compulsive neurosis, and these symptoms have diminished under psychotherapy.

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THE ARM REFLEXES

BY

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FOR many years the presence of decreased or absent tendon reflexes of the arm in healthy persons has been recognized, and the late Dr. Kinnier Wilson suggested that a study of these reflexes might assist in showing the frequency with which the variations occurred. For this investigation, the triceps, biceps, and supinator reflexes were examined bilaterally once in 466 persons and repeatedly, up to 324 times, in seven persons.

Objects and Methods

As the object of the study was to determine the conditions met with in ordinary clinical work, it was decided that clinical and not laboratory methods should be used. It was considered that if the results were to be of assistance in diagnosis, a simple method which could be used at the bedside should be employed. Consequently the reflexes were examined with Vernon's percussors. The whalebone handles were 8 in. in length and the round, circular heads were surrounded by rubber. Although, presumably, all would agree upon marked deviations from the normal extent of response, differences of opinion might be expressed by different observers over lesser changes. Consequently, several observers took part in this study, four assisting in the examination of the 466 persons who were examined once. One observer examined each person tested on more than one occasion, so that the variations in any one individual were based on one standard. The four observers of the 466 persons were included amongst those of the individuals examined on more than one occasion. It is hoped that average and not personal results have been obtained by this arrangement.

The subjects examined varied from 13 months to 70 years in age ; the males from 13 months to 63 years and the females from 16 months to 70 years (Table 1). They were all healthy.

Results

Persons examined once.—Of the 466 persons, 17 (3·6 per cent.) showed an absence of one or more reflexes. Of the 2,762 responses examined, 34 (1·23 per cent.) were found to be absent (Table 2). There appears to be little variation with sex or age, except that absence is more common over the age of 20 years.

TABLE 1.—SUBJECTS EXAMINED ONCE

AGE IN YEARS	NO.	NO.
	M.	F.
0– $9\frac{11}{12}$	113	71
10–$19\frac{11}{12}$	131	61
20–80	41	49
	285	181

TABLE 2.—REFLEXES PRESENT OR ABSENT BY AGE, GROUP, AND SEX

AGE (YEARS)	SEX	L.			R.			
		T.	B.	S.	T.	B.	S.	
0–$9\frac{11}{12}$	M.	111	112	112	111	112	112	P
		2	1	1	2	1	1	A
	F.	71	71	70	71	71	71	P
		0	0	0	0	0	0	A
10–$19\frac{11}{12}$	M.	131	131	131	131	131	131	P
		0	0	0	0	0	0	A
	F.	60	61	61	60	60	61	P
		1	0	0	1	1	0	A
20–80	M.	41	40	39	41	37	40	P
		0	1	2	0	4	1	A
	F.	45	49	44	47	49	46	P
		4	0	5	2	0	3	A

L=left ; R=right ; T=triceps ; B=biceps ; S=supinator ; P=present ; A=absent.

The observations made by the four observers on 100 subjects were divided into four groups. Fifteen persons showed an absence of one or more responses. This figure is nearly five times as great as that for the whole series of 466 persons. The difference is largely accounted for by the fact that only 12 of the 100 persons were below the age of 20 years, and, as seen in Table 2, absence of response is more frequent in those above this age.

Of the 600 reflexes examined, 445 (74·1 per cent.) normal responses were obtained, 81 (13·5 per cent.) increased responses, 41 (5·8 per cent.) diminished and 33 (5·5 per cent.) absent responses.

The variations from the normal were bilateral in many subjects (Table 3).

Of the total of 33 absent responses, 66 per cent. were bilateral ; of 41 diminished responses, 58 per cent. were bilateral, and of 81 increased responses, 68 per cent. were bilateral. Two-thirds is the proportion expected by chance, so that there is no biological significance in these somewhat similar figures.

Table 4 shows the results obtained according to individual reflexes. About

75 per cent. of reflexes gave a normal response, and of the variations, about 50 per cent. were increases of response.

Table 5 shows the time of day when variations occurred in the 100 cases examined once. There is a slight tendency for absent and increased responses to occur more frequently in the morning than the evening.

Persons examined many times.—The finding of so many variations from the normal during single examinations suggested that, perhaps, in all people the responses vary from time to time. Seven healthy subjects (6 males from 20 to 30 years of age and 1 female 20 years old) were examined in the morning from 7.30 a.m. to 11.30 a.m. and evening from 7.30 p.m. to 12.30 a.m. over periods of from 7 to 51 days (Table 6.)

On comparing Table 6 with Table 4, the percentages of normal responses from each table will be found to be not greatly different, 68·2 per cent. and 74·15 per cent., but the remaining percentages vary considerably. It is possible that the markedly higher rate of increased responses amongst subjects examined once, might be due to a heightened tone of the nervous system from anticipation. As the normal responses are in the same proportion, it follows that the absent and diminished responses must be less.

Two subjects were examined when shivering from cold. In one, all reflexes were increased ; in the other, two previously absent and one previously diminished became normal.

In one subject no change was observed after a walk, but in another all reflexes were increased after a strenuous day's work. In the same subject, the right triceps and right biceps were increased and the right supinator absent when this arm was tired after playing tennis. Twenty-four hours later, the triceps and biceps still gave increased responses, but the supinator gave a normal result. A further 24 hours later, all reflexes were normal. After doing a large amount of writing, one subject showed absence of the right biceps and supinator responses, whilst the other reflexes were normal. Ten hours later, all reflexes gave normal responses.

Observations made immediately on waking in the morning on two subjects

TABLE 3.—NUMBER OF SUBJECTS SHOWING BILATERAL DEVIATIONS FROM NORMAL RESPONSE

REFLEX	A.	D.	I.
All six	1	—	7
Both triceps	4	5	4
Both biceps	1	3	1
Both supinators	3	4	2
	9	12	14

A=absent ; D=diminished ; I=increased.

TABLE 4.—EXAMINATION OF 100 SUBJECTS ONCE

REFLEX	NO. OF EXAM.	A.	D.	I.	
L. Triceps	100	7	6	16	=29
L. Biceps	100	2	9	13	=24
L. Supinator ..	100	8	4	13	=25
R. Triceps	100	5	7	12	=24
R. Biceps	100	6	9	13	=28
R. Supinator ..	100	5	6	14	=25
Totals ..	600	33 (5·5%)	41 (6·84%)	81 (13·5%)	=155 (25·85%)

TABLE 5.—TIME OF DAY OF VARIATIONS

TIME	NO. OF EXAM.	A.	D.	I.
Morning ..	103	8 (7·76%)	1 (·97%)	18 (17·45%)
Evening.. ..	494	17 (3·44%)	40 (8·1%)	51 (10·3%)

TABLE 6.—EXAMINATION OF SEVEN SUBJECTS REPEATEDLY

SUBJECT	SEX	NO. OF EXAM.	NORMAL	ABSENT	DIMINISHED	INCREASED
1	M.	102	65 (63·7%)	7	7	23
2	M.	54	34 (63%)	0	20	0
3	M.	102	63 (61·7%)	20	19	0
4	M.	107	84 (77·8%)	3	15	5
5	M.	107	59 (55·1%)	12	36	0
6	M.	90	56 (62·2%)	1	3	30
7	F.	324	243 (75%)	42	36	3
Totals		886	604 (68·2%)	85 (9·6%)	136 (15·3%)	61 (6·89%)

TABLE 7.—BILATERAL DEVIATIONS FROM NORMAL IN SEVEN PATIENTS

REFLEXES	1	2	3	4	5	6	7	
All six	0	0	0	0	0	0	1†	A
	0	0	0	1	3†	0	0	D
	2*	0	0	0	0	4	0	I
Both triceps	0	0	0	0	1	0	0	A
	0	0	2	1	0	1	1	D
	1	0	0	1	0	0	1	I
Both biceps	0	0	1	0	1	0	2†	A
	0	7	3	2	0	0	1	D
	1	0	0	0	0	0	1	I
Both supinators	0	0	7	1	2	0	4†	A
	1	0	1	0	4	0	2	D
	0	0	0	1	0	0	0	I

* Once when shivering. Once after hard work. † Once on waking.

showed absence of all reflexes on two occasions in one of the subjects. In the other, all reflexes were diminished on one occasion, and four were absent, one diminished, and one normal on a second occasion.

The bilateral deviations from the normal are seen in Table 7.

Of a total of 85 absent responses, 47·1 per cent. were bilateral ; of 136 diminished 44·1 per cent. were bilateral ; and of 61 increased 39·4 per cent. were bilateral. These percentages are from 19 to 26 per cent. below what would have been expected by chance. Therefore some cause is increasing the unilateral variations in this series of observations at the expense of the bilateral, for the normals remain constant.

Some of the deviations occurred in series over certain time periods, but the majority were isolated as regards time. The isolated responses were so numerous as compared with those in series that the latter would be unlikely to have significance of any kind.

Table 8 shows the time of day at which the deviations occurred. The slight tendency for absence of response to be frequent in the morning in the 100 subjects examined once is apparent also in these seven cases, but a similar tendency for the increased responses is not apparent.

The individual responses are summarized in Table 9.

The proportion of variations from the normal, 31·2 per cent., approaches that of the variations obtained in the 100 subjects examined once, 25·8 per cent. These two figures tend to confirm one another.

Of interest is the observation that variations are more common in both arms in the biceps response than in the triceps and in the supinator than in the biceps.

Conclusions

1. In a series of 466 healthy persons examined once, absence of one or more arm reflexes was found in 3·6 per cent. of persons and of 1·23 per cent. of reflexes tested. Absence was more common over the age of 20 years than under this age.

2. Of 600 responses grouped into four types, 74·1 per cent. gave normal, 5·5 per cent. absent, 5·8 per cent. diminished, and 13·5 per cent. increased responses.

3. Each reflex, individually, gave about 75 per cent. of normal responses.

4. A slight tendency was observed for a greater proportion of absent responses to occur early in the day.

5. The reflexes in seven persons were examined repeatedly, from 54 to 324 observations being made on each subject. Normal responses were recorded in 68·2 per cent. of reflexes, confirming the figure of 74·15 per cent. found in single examinations. The variations in single examinations in healthy subjects are, therefore, probably of a temporary nature only.

6. Cold and exercise appeared to increase the responses in some subjects. Extreme exercise was followed by absence of response in two subjects. Observations made immediately on waking in two subjects showed absence or diminished responses.

7. From 40 to 47 per cent. of the variations from the normal were simultaneously bilateral. No cause has been found for this proportion in these subjects examined repeatedly.

TABLE 8.—TIME OF DAY OF VARIATIONS FROM NORMAL IN SEVEN PERSONS EXAMINED REPEATEDLY

TIME	NO. OF EXAM.	A.	D.	I.
Morning	443	49 (11·05%)	68 (15·3%)	20 (4·5%)
Evening	443	36 (8·12%)	68 (15·3%)	41 (9·3%)

TABLE 9.—RESPONSES IN SUBJECTS EXAMINED FREQUENTLY

REFLEXES	NO. OF EXAM.	A.	D.	I.	
L. triceps	147	5 (3·38%)	14 (9·46%)	14 (9·46%)	=29
L. biceps	147	5 (3·38%)	23 (15·5%)	9 (6·08%)	=37
L. supinator ..	148	26 (17·54%)	24 (16·2%)	9 (6·08%)	=59
R. triceps	148	5 (3·38%)	18 (12·15%)	10 (6·75)	=33
R. biceps	148	8 (7·45%)	30 (20·2%)	11 (7·44%)	=49
R. supinator ..	148	35 (23·6%)	24 (16·2%)	7 (4·72%)	=66
Totals	886	84 (9·46%)	133 (14·96%)	60 (6·82%)	=277 (31·2%)

PERSISTENT MIRROR-MOVEMENTS AS A HEREDO-FAMILIAL DISORDER

BY

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(RECEIVED 13TH AUGUST, 1938)

THE following case of persistent mirror-movements is interesting from several points of view. Although the familial occurrence of this phenomenon is known, very few cases and pedigrees are actually on record, and this alone would justify the publication of a family observed by the writers, along with some observations on the few cases found in literature.

Personal Case

Summary.—Male of 49 years, admitted in a state of depression and severe retardation without any signs of an organic illness. Complains of and shows "double action," i.e. active and passive movements of one upper extremity are accompanied by symmetrical movements of the other.

Personal History.—Little is known of his early childhood, except that it was an unhappy one, owing to his maternal grandfather's alcoholism. No definite neurotic traits are known, but he was a nervous, frightened child ; nevertheless, he did well at school and was asked to take a scholarship, but did not do so because of the indecision of the family. He was good at arithmetic. He got on well with the teachers, but was shy and frightened of the boys and seldom played, although he wanted to do so. After leaving school, he worked in the Arsenal, apparently staying in the same job till he was 21 because of indecision, as it was a job which most boys left when they were 17. He became a reliable workman, but never got on because of his indecision. He served in the War, was gassed, and took a long time to recover. His work since then has been that of a warehouseman, and he has continued at it with occasional periods of unemployment up to the time of his present illness, earning £2 a week. He married in 1911, at the age of 24, gets on well with his wife, and has three children.

All his life he has lacked confidence, finding it difficult to make any decision, no matter how small the matter may be. He is slightly better when away from the environment of his own family. He has always been slow in all his actions, and this has gradually increased with age. He cannot be hurried, and is said to take ages to dress or prepare for anything. He is silent and reserved, dislikes meeting people, and is happier when out of work. He reads a great deal, mostly adventure stories and occasionally the papers. He is not religious, nor does he belong to any club. He likes the cinema and is very fond of gardening. In 1924 he had a small allotment, and could hardly believe it when he found that he had grown something. His wife found that he had not told her that some vegetables were ripe because he could not believe it.

Present Illness.—In April, 1935, he knocked his leg, and although it got well he worried about it unnecessarily. In August, 1935, he was in St. Nicholas' Hospital for

10 weeks with a carbuncle on his neck. About this time he began to behave strangely, he would stand about doing nothing, saying nothing, and would not even go to bed until his wife made him. He could not make up his mind to do anything, and complained that he seemed to be two people. He managed to carry on with work for another 11 months. In 1936 he was in hospital with pleurisy, and during that time never spoke spontaneously, read, nor answered any letters. He went back to work, but could not get on with it ; he was seen to stand for two hours with a sack on his shoulder and his hand on his head trying to make up his mind what he was to do. He was eventually discharged. He developed a series of stock phrases, such as " Good morning, doctor," which he would repeat over and over again. He said that he was very unhappy, that his legs felt like rubber, that there was no hope for him, and talked about drowning himself. Attended the outpatient department and was admitted. The " double action " was only referred to by chance as something from which he had suffered for a long time, which was a family affliction, and which was not considered to have anything to do with his present depression.

Mental Status.—He appeared depressed and sat very still with his hand to his head and a gloomy expression on his face. He showed motor and psychic retardation, but was co-operative and friendly. His voice was monotonous and slow, with a pause before answering questions, and there were no spontaneous utterances. His mood was one of depression and pessimism about the future. He said, " I don't seem to get better ; I don't think anything can be done for me." Complained of hot flushes in the face and head and a feeling of being muddled and unable to make up his mind. There were no delusions, hallucinations, or compulsive phenomena. He was correctly orientated, and was able to give an account of his illness, though it took a long time to get it from him. He was able to do the usual tests slowly. He explained this by saying : " I'm not muddled over things like that ; I'm only muddled over how I am now. I seem to get worse. Things keep repeating in my mind. I'm all wrong ; everything everybody says to me I mean to say no to."

Routine Physical Examination.—No abnormalities were found in any of the systems. The eye movements were normal ; there was no nystagmus, he could close each eye by itself. The pupils reacted normally. Movements of lips and tongue were normal, deep reflexes equal, brisk, and did not spread to the other side. Abdominal reflexes present, plantar reflexes flexor. There was no paresis, ataxia, choreiform, athetoid, or similar hyperkinesis, no sensory loss, no stereognosis or apraxia. His facial expression was one of depression ; expressive movements were scanty, he showed little spontaneity, and was slow in all actions. All active movements of his right hand were accompanied by symmetrical movements of his left, and vice versa. The associated movements were generally smaller in extent and often seen only as a faint symmetrical jerk. He could control these movements to such an extent that often they could not be seen at all, though he stated that he could feel the stiffness of the muscles. He said that the " double action " was most marked with forceful movements, and, indeed, movements carried out against resistance or requiring special effort showed the associated movements very clearly, but they could also be seen accompanying ordinary movements, so long as he did not concentrate on suppressing them. The associated movements of the left hand with active movements of the right were, ceteris paribus, stronger than vice versa. The associated movements always occurred in strictly symmetrical muscles, and did not spread beyond the normal synergisms, either on the leading or on the secondary side.

Passive movements of either upper extremity were also accompanied by mirror-like associated movements of the symmetrical limb. The more the patient's attention was distracted from the test, the more clearly this effect could be seen. The associated movements were smaller in excursions than those seen with active movements, but similar in that they were more marked from right to left than from left to right. They could be easily demonstrated in pronation and supination movements of hand and forearm, in flexion of the arm, or in flexion and extension of the hand. Movements of

the fingers and movements other than those mentioned which would need a somewhat unnatural starting position did not produce the associated movements. Occasionally, instead of the symmetrical movement a parallel one could be observed, i.e. if the patient's right hand was suddenly supinated, the left did not supinate but pronated.

Electrical stimulation of the muscles of either upper extremity also produced associated reactions in the symmetrical ones, but mirror-like and parallel associated movements were seen in approximately equal proportions. Reactions only appeared when the current used was sufficiently strong to produce a marked " spastic contraction." It seems that the parallel associated movements only occur if the patient innervates his antagonists as a response to the painful contraction of the stimulated muscle. This observation may also cast light on the origin of the atypical effects of passive movements. The analysis of slow-motion pictures showed that in pronation-supination movements a visible associated movement started later than the original movements.

When requested to write or to do simple drawings, the mirror movements appeared, though he tried to control them by closing his hand tightly or pressing it on his knee. His mirror writing with his left hand was very good and similar to his right-hand writing, though there was hardly the difference in size which usually distinguishes the writing of both hands. The direction of writing and drawing of the left hand when tested with both hands corresponded to what is the rule in all normal persons, as soon as visual control is necessary the movements became parallel instead of mirror-like (compare the same observation in Lange case).

He was able to distinguish left from right. When shown drawings of extremities he started imitating positions, but named them afterwards without a single mistake. He recognized and named the geometrical patterns in Ableson's test. He did the Porteus mazes for years 12 and 14 slowly and correctly, without help. He recognized the colours of all wood samples, naming them correctly in all shades. He constructed with mosaics up to 7 in all different colours without difficulty (allowing for the retardation). He was able to do one of the complicated geometrical puzzles well. He put together words up to 7 letters (from wooden letters), and numbers up to 5 digits.

Diagnosis : Endogenous depression. Persistent mirror movements. No organic illness.

Family History (*see* p. 18)

Cases of persistent mirror movements in neurologically and mentally normal persons have been published by several writers (Fragstein, Burr and Crow, Stief and Dancz, Avery). As far as synkinesis when writing is concerned, the literature can be found in Critchley's monograph. But only in a very small number of cases is the disturbance familial in occurrence. The following family tree shows the relationship of the members affected to the patient (Pt).

I. The paternal and maternal grandparents are known to have been normal, except that the maternal grandfather, I.1. was a very heavy drinker.

II.1. Mother. Aged 83, still alive. Is a nervous, fussy woman, indecisive and unable to tackle difficulties. She is very hypochondriacal.

II.2. Paternal uncle. Is known to have had marked associated movements, though little else is known about him.

II.3–9. Little known, except that they did not have associated movements.

II.10. Father. Died aged 76. Showed " double action " very markedly. Whenever he did something with one hand, the other would do the same. He was a heavy drinker, pessimistic in his outlook, easily confused by any trouble, and unable to concentrate. As he grew older he became progressively slower in speech and action. His wife states that there was something about mental illness on his death certificate.

III.1. Sister. Aged 58. Has not got " double action." She has always suffered from heart trouble, asthma, and psoriasis. She is nervous, oversensitive, easily

offended, and said to be slow in her actions. She is married and has two healthy children.

III.2. Sister, aged 56. No " double action." Said to be the most healthy and stable of all. Married and has five children.

III.3. Brother, aged 54. (Personally interviewed.) A cheerful-looking man, but inclined to worry easily—for example, he gets upset and unsure of his ability if put on to a different job. On examination he appeared anxious, a little flushed, a little too jocular, and sweated slightly. He was slow in producing matches to light a cigarette, being impeded by a difficulty in controlling the right hand. He was able to give a good account of himself. He is right-handed, the left hand follows the right; the converse occurs, but less markedly. The legs are not involved. He has found difficulty in his work as a moulder, e.g. in using a hammer and chisel the left hand has to be controlled. He cannot play the piano, of which he is very fond, because as his right hand goes up the keys his left must go down. He therefore has to knock out a tune right-handed. He is handicapped in sport, of which he is very fond. He has to take up things like weight-lifting or swimming, but cannot swim side-stroke, because it is not symmetrical. Cricket is all right because in batting both arms swing together. His fencing can never be classical because his left hand " jiggles about." Homely acts like shaving or taking off his hat are impeded by the other hand wanting to join in, and he has on more than one occasion found himself raising his hat with both hands. He is very self-conscious about his disability, because he feels that one half of him is " daft." Has always been afraid to tell any doctor about it, talks of it as the family affliction, and thinks his brother's mental trouble is related to it. Is married and has three children.

III.4. Sister, aged 51. (Personally interviewed.) She never noticed that she suffered from " double action " until it was pointed out to her when she was a girl. She has always been easily tired, always wanted to " flop " when extra work was necessary, always got flustered easily, especially at times of stress, never could do arithmetic properly. When pouring out tea with right hand the other hand wants to do the same, and she has been known to empty a sugar bowl on the floor in this way. She can feel the muscles move in the left hand, and has to control them consciously. If she takes her time, e.g. in doing her housework, she can control the movements better, but this effort makes her feel depressed and she worries because she cannot do as others do. The difficulty is worse at times of stress, monthly periods, etc. Never notices it in legs, only in the arms. She is married and has four children, one of whom has " double action."

She was cheerful, but talked with marked self-consciousness and almost with fright about her disability. She has never mentioned it to a doctor, and was loath to discuss it or to implicate her son. She said that she had to be continually on her guard against giving herself away.

III.5. Brother, aged 47. Has no " double action," but is slow in talking and gets easily confused. Is married and has three healthy children.

III.6. Patient. (See elsewhere.)

IV.1 and 2. Both well. One is seamstress and the other able to play the piano.

IV.3–7. All healthy and normal. One plays the guitar for a living.

IV.8–10. All healthy and normal. All able to play the piano.

IV.11. Nephew, aged 25. (Personally interviewed.) Has " double action " very markedly. He has always had " bad nerves," and has twice left home because he was upset. He gets depressed and grumbles about his disability ; has never put his mind to a proper job because of it, and has thrown up many. Has caused considerable trouble to his mother and family. He is especially annoyed because he cannot play the piano, of which he is fond. Says : " I wish this wasn't so ; I could play as well as anybody." On examination he has associated movements with both active and passive movements, but not with relaxation. His writing with his left hand is indistinguishable from that with his right, although he has never practised it.

IV.12. Nephew, aged 22. No " double action," but he is described as having formerly been moody and slow in actions.

IV.13 and 14. Twins, aged 15. Healthy.

IV.15–17. Healthy and normal. They are described as smart, capable young men.

IV.18. Daughter, aged 24. (Personally interviewed.) No " double action." She used to be nervous, but has improved. Now works as a housemaid, is able to play piano.

IV.19. Son, aged 23. (Personally interviewed.) Never noticed anything wrong, is a tool-maker, can play piano and ukelele.

IV.20. Son, aged 19. (Personally interviewed.) Nothing has been noticed by others, but he himself thinks he has some degree of " double action " ; says : " When I am doing something with one hand, and the other has nothing to do, there are slight movements in it. For example, when cleaning a shoe, I can feel a tendency to move the other hand." He says that the left hand is more inclined to follow the right, but, on examination, associated movements could be seen more clearly from left hand to right ; although he has never practised it, he can write well with the left hand.

Discussion

As mentioned at the beginning of this paper, only a few cases of this kind have been reported in literature, and the family trees, as far as they can be construed from the case records, are far from being complete. Only Levy and Drinkwater examined the relations of their cases, whereas in the other observations only the patient's description is available.

As can be seen easily in the family trees, the disturbance is directly transmitted in all but the case of Drinkwater. He was interested in the mode of inheritance, and thought that the disturbance was transmitted as a single dominant, not sex-linked gene, and he assumed that his propositus' mother (who transmitted the disturbance from her mother to her children) might have made a complete recovery. He was led to this assumption, because another member of the family mentioned a decrease of the disturbance with advancing age. This, however, is the only case where this happens ; in all other instances the disturbance is described as absolutely stationary. In any case, the assumption of the disappearance seems hardly necessary, since incomplete dominance is so common, i.e. the probability of manifestation is rarely 100 per cent. In our family there is also a direct transmission ; the number of descendants is much too small for any statistics on the proportions of affected members, but the findings are well in keeping with the assumption of a single dominant gene.

So far, the mirror-movements have been regarded as an entity. On closer analysis, however, there is much that is very problematical.

The discussion of synkinesias or associated movements has been greatly impeded by the confusing nomenclature. Kinnier Wilson rightly says : " Among the tangled mass of movements described by different observers as . . . associated movements, reflex synergias, movement synergias, and associated reactions the student may well be excused if he loses his way."

Foerster in his monograph on *Mitbewegungen bei Gesunden, Nerven- und Geisteskranken* divides the phenomena in question into (1) synkinesias under

CHART 1

PERSONAL CASE

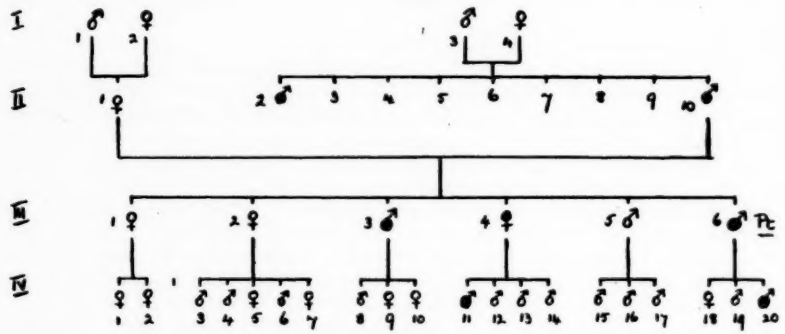


CHART 2

FAMILY DRINKWATER

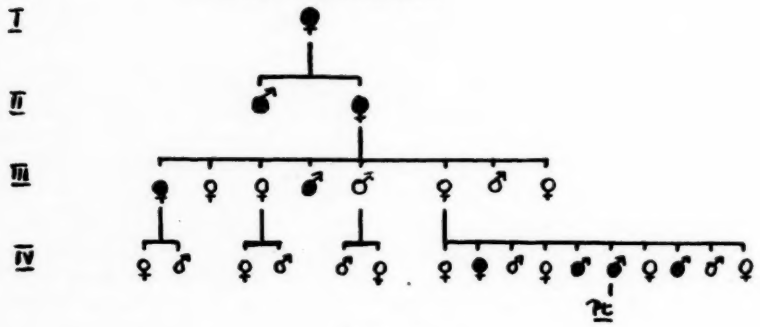
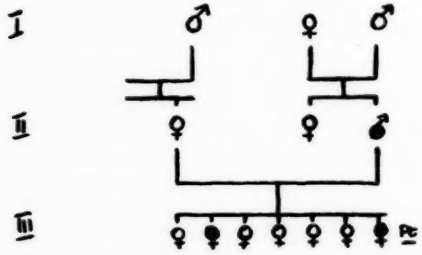


CHART 3

FAMILY LANGE



FAMILY HELDMANN

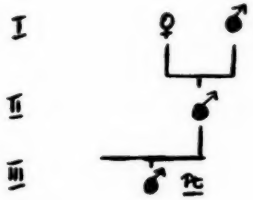
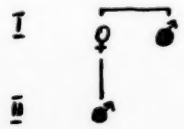


CHART 4

FAMILY LEVY

FAMILY DAMSCH I



physiological conditions, and (2) synkinesias under *pathological* conditions (e.g. peripheral and pyramidal lesions, tabes, chorea, etc.). The former are divided into (*a*) normal purposeful and (*b*) normal purposeless synkinesias. Purposeful synkinesias occur with all intended movements, in fact, all normal movements may be regarded as consisting of two components, the chief movement and the associated movements. As examples of this type of normal purposeful synkinesias, Foerster writes : " If the hand is closed, not only are the fingers bent, but the hand is extended also ; if the eyes are closed, the shutting of the eyelids is the chief movement, upward turning of the eyeball and narrowing of the pupil being synkinesias ; when looking upwards not only the bulbi are turned up, but in addition the upper lid is lifted and the forehead wrinkled." Foerster feels justified in analysing the normal purposive movement like this for two reasons : (1) the synkinesias are not original components of the movements ; they are absent in infancy and are only acquired later in life ; (2) they can be lost in disease. Kinnier Wilson has various objections to Foerster's concept of Mitbewegungen. He distinguishes, for example, two phenomena within Foerster's normal purposeful synkinesias. According to him they ought to be described partly as normal components of movement, partly as movements of co-operation. The interplay of agonists, synergists, fixers, and antagonists should not be called " movement synergia," since there may be a " co-operation of antagonism " ; here we are dealing with normal components of voluntary movements ; on the other hand, one ought to speak of movements of co-operation, if one means " movements that are auxiliary to other also voluntary movements, preceding or accompanying them, such as putting the feet back before rising from a sitting position, etc." This is certainly a very useful distinction which points to the profound difference between movement and action. We shall try to omit this psychological problem as far as possible.

The term *associated movement* is used by Kinnier Wilson to denote " those involuntary movements of one limb which may be seen to accompany forceful voluntary movements of its fellow on the other side." This nomenclature is certainly clearer than that of Foerster, who includes under the same term (Mitbewegungen) normal muscular components, spread of movements in hemiplegic cases from one group to another in the same limb, and also the mass movements of tetraplegia and spastic paraplegia. Although Kinnier Wilson appears to object to this procedure, he himself in a preceding paragraph writes about the " associated movements " in his sense as " readily elicitable, *more particularly in cases of hemiplegia and diplegia.*" These movements which occur in pathological cases do not fit into his definition, since " they are often spread on the second side in a way not to be seen in the first " ; in other words, they are not " movements of one limb accompanying movements of its fellow on the other side " any more. As is so often the case, this difficulty of definition points to a problem in the facts : it is doubtful if the " associated movements " in Wilson's sense are identical with the phenomena, roughly of the same kind, to be observed in hemiplegia, paraplegia, and other pathological conditions, and connected with the tonic reflexes (Simons, Walshe). The mirror-move-

ments in our patient (and his relations) may be regarded as a classical example of " associated movement " in Kinnier Wilson's sense.

Only a few writers have given any attention to the fact that synkinesias of some kind may also be present in extra-pyramidal lesions, and little use has been made of such cases in forming theories about the pathology of these symptoms. Wilson has studied " associated movements " in cases of hemiparkinsonism and found that " in the performance of individual movements with the affected arm, hand, or fingers, an identical mirror movement is executed on the sound side."

All the motor phenomena discussed can be observed accompanying (or immediately preceding or following) voluntary, active movements. There are, however, some observations on record where passive movements of one limb produced similar reactions. Alexander has recently studied this phenomenon which he calls " Mitbewegtwerden." The two cases which he investigated both had pathological conditions, one being infantile hemiplegia, the other post-encephalitic parkinsonism in a patient who had suffered from epilepsy before the encephalitis. Their synkinesias also accompanied movements produced by electrical stimulation of the muscles. In the hemiplegic case they could be elicited only in the paralysed arm (by moving the healthy one). In the post-encephalitic case they worked both ways. Alexander found this passive variant of synkinesias only in one other instance, although he examined a large number of organic cases as controls (unfortunately there was apparently only one case among his 53 controls that had associated movements with active movements without special effort). Other writers on synkinesias hardly mention this passive variant, but when they do they emphasize how rarely passive movements are accompanied by associated movements. Walshe, for example, who made a very thorough investigation of associated movements in hemiplegia says : " Passive movements of the limbs have not been found effective in producing associated reactions."

Unfortunately the examination of the cases of familial mirror-movements which we collected from literature is not complete in this respect. The data found are given in the following table.

NAME OF AUTHOR	ASSOCIATED ACTION PRESENT IN :			TYPE OF MOVEMENT :			ADDITIONAL CASES IN FAMILY
	FACE	UP. EXTR.	LR. EXTR.	PASS.	ELECT.	RFL.	
Damsch	0	++	+	nn	+	nn	1
Levy	+	++	0	nn	?	0	2
Drinkwater	2	++	?	++	nn	nn	7
Heldmann	+	++	?	nn	+	nn	2
Lange	0	++	+	nn	nn	nn	2
Own case	0	++	0	+	+	0	6

0=absent. nn=no note.

Practically all writers agree that the mirror movements as shown by our patient are closely related to the associated movements found in children and adolescents. Movements such as used for testing adiadochokinesis (also alternate opening and closing of the fist, touching of the thumb with the other fingers singly) tend to be accompanied by the same movements of the corresponding hand ; this phenomenon is present normally, though to a variable extent, up to approximately the age of puberty, and then it decreases with age (Curschmann). Forceful or complicated innervations elicit mirror movements more readily than ordinary ones. They are generally less marked if the dominant hand leads than vice versa ; in other words right-handed children show less associated movements in the left hand than in the right. With the progress of motor development these synkinesias decrease in intensity and finally disappear, although the tendency for symmetrical innervations can be demonstrated in normal adults if they have to learn to carry out new and complicated patterns of movements. In children and adolescents with retarded motor development, they may exist longer and appear more obviously than they do in subjects with well-developed motor systems.

Neither our patient nor any other member of the family was able to describe a definite onset of the disturbance, and this may be used as an argument that it really is the persistence of the early stage of the motility. Subjects like our patient would appear to have a partial infantilism, a developmental error in a particular motor function which may or may not have a structural basis. The possible existence, site, and type of the anatomical anomaly, if any, are irrelevant for this conception.

There are, however, two clinical differences between our patient's and the infantile mirror-movements : first, the converse variation of intensity with regard to the dominant hand, and secondly, the absence of the associated movements with passive movements in children. Although the conditions are not to be paralleled, the first difference recalls that between extra-pyramidal and pyramidal hemiplegics. In the former the movements of the paretic, in the latter those of the healthy hand cause associated movements more readily. In children the preference corresponds to that in extra-pyramidal states. We do not think that the phenomena observed by Wilson in hemi-parkinsonian states differ in essence from the associated movements of normals : the increased effort necessary to overcome the extra-pyramidal disturbance produces the overflow into symmetrical parts ; this is a normal mechanism. There is no reason to assume any pyramidal involvement in our patient or in his family to explain the " hemiplegic " accentuation in their associated movements. There is also nothing to suggest a parietal lesion. The difference in accentuation of the synkinesias, as compared with that in children, seems to be accounted for by the patient's attitude towards the phenomenon : he permanently struggles against it and tries to control it ; he does so by means of active innervations, and this highly complicated motor activity is more easily and more successfully carried out with his (dominant) right hand. Therefore the synkinesias are better seen in the left hand. In Lange's left-handed patient, who was apparently less self-conscious of his movements than our patient, the mirror-movements

were also more marked when the left hand led. The second difference seems much more important. By the kindness of Dr. Creak (Physician in Charge of the Children's Department) it was possible to test a large number of children who exhibited symmetrical associated movements. Most of the children had no neurological symptoms, a few were cases of slight infantile hemiplegia or mild choreoathetotic conditions. In only one was there found the slightest tendency for synkinesias with passive movements, the only exception being a very shy and tense girl of twelve who showed marked synkinesias of the ordinary type, with active movements. If the examiner moved her hands, slight mirror movements were sometimes seen. But, by simulating the beginning of the test movement and not carrying it out, it could be shown that the movements were due to her own active efforts, and once her attention was successfully diverted the synkinesias disappeared. It has been found in many examinations that mechanisms of this kind were not present in our patient and the other members of the family.

The few authors who have discussed passive associated movements agree that their physiology must differ fundamentally from that of the active movements. Fragstein, who was mainly interested in the mirror reactions after electrical stimulation, thought that a direct transmission of the stimulus (by means of antidrome conduction on the primary side) is responsible for the occurrence. Otherwise it is generally assumed that this type of synkinesia is a reflex, the stimulus of which is the primary movement, the centripetal path the sensory fibres from joints or muscles participating in the primary movement. Alexander, who studied the Mitbewegungen so carefully, distinguishes this phenomenon clearly from the crossed reactions described by Sherrington, which consist of mass movements and lack the strict symmetry in parts of limbs, even muscles. Clinical and anatomical considerations make Alexander assume the centre for the passive mirror-movements in the region of the substantia nigra. Experimental proof of the reflex nature of the passive synkinesias is missing, and it does not seem very satisfactory to assume a different origin for the " active " and " passive " movements when they are so closely related and so similar in appearance. It is worth considering the possibility that the " active " synkinesias are also of reflex origin, or alternately that the " passive " synkinesias may be due to the same central connection as are the active ones. It is hoped to discuss these points in a further communication.

The following classification of associated movements is suggested :

A. Normal : (1) Components of movements.
(2) Movements of co-operation.
(3) Mirror-movements, transient, in children, and in adults when acquiring new patterns of movements.

B. Abnormal : (1) Symmetrical without spreading (parkinsonian type).
(2) Symmetrical with spreading.
(3) Mirror-movements, persistent.

In each group associations accompanying active or passive movements have to be distinguished.

In conclusion, the psychological aspect of our case may be mentioned, i.e. the patient's attitude to his disturbance. He appears to have always regarded his motor anomaly as a kind of foreign body ; he has tried to hide it and has developed a system of economy of movements which to some extent helps to prevent its manifestation. This attitude is familial, like the disturbance itself ; differences in the personalities concerned may account for the fact that some members minimize it, whilst others study it and develop methods to overcome it. But it is known and feared throughout the family, and there is a vague idea it might be a sign of imminent madness. The more striking is it that it plays no part in the symptomatology of the depressive illness which our patient developed. He complains of all sorts of physical malaise, but the " double action " is never spontaneously mentioned. If he is questioned about it, he generally says that this does not concern him now, but his head is dull and his feet feel like rubber, etc. It is a most striking example of the endogenous character of even the symptomatology of the endogenous melancholia.

Summary

A case of persistent symmetrical associate mirror movements is described in which the associated movements accompany both active and passive movements, and in which the disturbance is familial in occurrence. The observations found in the literature and the present case point to a single dominant, not sex-linked factor as responsible for the syndrome.

The various types of normal and abnormal associated movements are discussed and a classification of the various types proposed. The difference between associated movements with active and with passive movements is emphasized. It cannot yet be stated how far the physiology of the two types differs.

In children mirror-movements with active movements are physiological, but they never occur with passive movements. This difference from the case recorded must cause some reserve in regarding the familial disturbance as an inherited developmental delay.

The patient's depression is independent of his neurological anomaly. Though the latter is an important factor in the make-up of his pre-psychotic personality, it plays no part in the symptomatology of his present mental illness.

We wish to thank Professor E. Mapother for permission to publish this case.

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SHORT-DISTANCE PROGNOSIS OF SCHIZOPHRENIA

BY

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From the Research Unit of the Maudsley Hospital

(RECEIVED 22ND AUGUST, 1938)

To make an assessment of the value of the new methods of treatment of schizophrenia by hypoglycæmia or convulsions, it is necessary to have comparative material on the course of the disease without such treatment. The ideal method of obtaining such material would be by the provision of a control series of cases, selected at the same time and in the same way as a treatment series, and by the comparison of these two groups one with another. The obstacles in the way of any such investigation are, however, very considerable : it is, for instance, very difficult to refuse treatment to a suitable case for purely scientific reasons, especially if one has any strong belief in the value of treatment. The testing of a system of treatment by simultaneous controls can only be carried out at a time when no one has any great faith in the value of the treatment. In the case of the modern treatment of schizophrenia, this time is already past. It remains, therefore, to provide comparative figures on the course of the disease without active treatment from the data of previous years.

Most authors who have made prognostic studies of schizophrenia have been particularly interested in the final outcome, and have therefore followed up their cases for the longest possible period of time. In so far as the more immediate subsequent history is neglected, these studies are of little relevance to the problem that now faces us. For obvious reasons one wishes to know just now more of the course of the illness within the first few years of the onset, and the need of comparative material for this period has been emphasized by workers with the new methods of treatment. Judgment of the final effects of treatment will in any case have to be postponed for many years.

From recently published statistics it is difficult to obtain any satisfactory picture of the course of schizophrenia, since the material of the various authors differs in fundamental respects. For instance, the remission rate of mental hospital patients will necessarily be much lower than that of the early and acute cases admitted into observation wards or into the university clinics of the Continent. The material investigated is not sufficiently characterized merely by the diagnosis " schizophrenia " : its character from the prognostic point of view is largely determined by the administrative type of the hospital and the legal and social requirements and conditions governing admission. This has rarely been discussed by previous writers.

Wootton and co-workers have followed up 104 schizophrenics admitted to Ewell Mental Hospital between 1928 and 1931. At the time of investigation (published 1935), 47 of these cases had been discharged, of whom 18 had made a total recovery ; one more was able to live in a sheltered environment outside hospital ; another had a minor relapse only ; and another nine cases had had to be re-admitted to a mental hospital. In other words, they found a recovery rate of less than 20 per cent. for an observation period of 2 to 5 years.

Among authors who have collected material with a special view to comparison with the results of insulin (or cardiazol) treatment, Dussik found similarly 20 per cent. of spontaneous recoveries. Faurbye states that of 72 patients whose illness was of comparatively recent onset and who had been admitted to the hospital at least one year previously, 40 were discharged from hospital, and of these 40, 30 had more or less recovered. He found therefore a crude recovery rate of 42 per cent. On the other hand, Ederle states that of 197 schizophrenics treated in the Tübingen clinic in 1935 only 3 to 4 per cent. left the clinic in a full remission. The length of treatment is not stated, and it seems likely that a number of patients left the clinic for a mental hospital, but subsequently recovered there.

Braatöy collected his material from a mental hospital, and followed up the cases for 5–7 years after their admission. Among the schizophrenics he found at the time of the inquiry 20 per cent. recovered and approximately another 10 per cent. improved. Horwitz and Kleiman's figures are not comparable with ours, since the period of observation of recent cases is much shorter. Furthermore, they dealt only with the cases that had been discharged, and do not say how many cases were permanently invalided in hospital. Briner's results, which seem of all those in the literature the most comparable with ours, will be contrasted with our figures later on.

Considering the difficulty in finding an " average " material and having in mind a future comparison with treated cases, we have collected a material of schizophrenics selected (not by us) for particularly good prognostic outlook : for it would seem that if any treatment can offer better results than those obtained with this material, this method would be definitely justified ; whereas an unfavourable comparison would have to be evaluated in the light of the selection of cases.

The Material

This investigation is based in the first instance on all the schizophrenics discharged from the Maudsley Hospital between 1st January, 1934, and 31st December, 1935, inclusive, and refers to their state on 1st January, 1938. In general, the Maudsley Hospital admits only those who prima facie have a favourable outlook. This constitutes a first selection of our material. Secondly, we ourselves excluded all cases of 46 years or older, all those cases whose illness antedated admission by more than 12 months, and all those cases in whom we had the slightest doubt of the diagnosis of schizophrenia.

For the purpose of this investigation, the first appearance of manifest psychological changes was regarded as the point of onset of the illness. Though

it is difficult, as a rule, to determine this point with any accuracy, we were in a favourable position to do so, as several independent histories were generally available in the hospital notes. We feel satisfied that all cases with an insidious change in personality dating back longer than a year have been excluded. It was thought advisable to exclude all cases more than 45 years of age, as it seemed likely that patients older than this would not be taken for active treatment. Our diagnostic criteria were strictly applied. Cases were taken for follow-up only if all three investigators were agreed on the diagnosis. Our opinion was, however, based solely on the material available at the time of discharge. The selection was carried out before the follow-up started, and no subsequent corrections of diagnosis have been made in the light of after-results. It seems only fair to say that we disagreed with the hospital clinicians as to the diagnosis (on grounds of insufficient certainty) only in a very small minority of cases.

Method

The patients were traced by correspondence, and information and records from all the hospitals and other institutions in which they had been since discharge from the Maudsley were obtained. In the case of those patients who were in a mental institution at the time of the inquiry, no further investigation was made. In the great majority of the other cases, however, further investigation was made by a social worker and by ourselves. The reports obtained from patients and relatives by letter were regarded as sufficient only where the information was unequivocal and the patients were inaccessible. In all other cases the social worker paid one or more visits to the home, and in cases of doubt the patients were induced to attend hospital to be seen by us. The numbers investigated in all these ways are given in Table 1.

TABLE 1.—COLLECTION OF MATERIAL

	SEEN BY SOCIAL WORKER :		SEEN BY DOCTOR :		LETTER ONLY
	PATIENT	RELATIVES	PATIENT	RELATIVES	
MALE					
F.I.	2	4	1	1	4
S.D.	6	5	4	1	1
S.R.	2	5	2	2	2
T.R.	6	5	5	1	3
Total Male ..	16	19	12	5	10
	Untraced : 2.				
FEMALE					
F.I.	2	1	5	2	5
S.D.	5	4	1	1	1
S.R.	8	9	1	1	2
T.R.	19	12	4	2	6
Total Female	34	26	11	6	14
	Untraced : 2.				
SUM TOTAL M. and F. ..	50	45	23	11	24

Untraced : 4.

As in all follow-up studies of this kind, it was not possible to make the investigation as complete as we desired. One may, however, say that the information obtained and the opinions formed by our well-trained social worker tallied with our own in every case where a check was possible. We wish to take this opportunity of thanking Miss M. A. Brown for her skilled and valuable assistance. Any errors in the classification of the state of recovery caused by insufficient information will tend to be in an optimistic direction—the degree of recovery will be overrated. The conclusions drawn will therefore be influenced, if at all, in the same direction as by our selection of optimal material.

Classification of Results

The classification of our results was carried out by the three writers conferring. The following standards, adopted from those suggested by M. Müller, were used :

T.R.=total recovery, freedom from symptoms and signs, return to previous social environment and to previous or to an equivalent occupation.

S.R.=social recovery, return to previous social environment and to previous or equivalent occupation, in spite of presence of minor signs and symptoms, such as irritability, shyness, shallowness of affective response, etc.

S.D.=social defect, presence of minor symptoms as above, incapacity to carry out work of previous level and failure to maintain self in the same degree of social adaptation.

F.I.=family invalid, presence of well-marked symptoms, incapacity to carry out any useful occupation, but manageable at home.

H.I.=hospital invalid, i.e. the inmates of mental hospitals, some continuously since discharge from the Maudsley, some relapsed after a temporary recovery.

D.=dead.

U.=untraced.

The Results

The results of the investigation are given in Table 2. The most important fact to be drawn from this table is that (after an average period of observation slightly exceeding three years) 41 per cent. of the cases are in mental hospitals. Including family invalids, one may say that more than one half of the cases have deteriorated to a point where they must be regarded as invalids. On the other hand, over a third (34·5 per cent.) have made a recovery to a point where, from the purely social aspect, they are as good as they were before the illness, without any of the modern drastic therapeutic measures. The recoveries with social defect (8·3 per cent.) form an intermediate group. They certainly cannot be spoken of as recovered, but they are not a burden on the community.

The significance of our material for comparison with the results of treatment is illustrated by the following example. Horányi-Hechst and Szatmári have

recently published a paper in which they express their scepticism as to the value of insulin treatment. They treated 64 patients, and attained 47 per cent. of what we would call total and social recoveries. They regard this as exactly what one would expect in the light of previously published statistics from an untreated material. If, however, one considers that in their 64 cases there were nearly a third (21) chronic cases, and that their results are better than those found in the present optimal material of recent onset and favourable prognosis, the comparison is greatly to the advantage of the treated material.

TABLE 2.—FINAL RESULTS

	M.	PER CENT.	F.	PER CENT.	TOT.	PER CENT.
H.I. with free intervals ..	10	12·7	15	13·8	25	13·2
H.I. without „ „ ..	24	30·4	28	25·7	52	28·0
F.I.	9	11·4	9	8·3	18	9·7
S.D.	8	10·1	7	6·4	15	8·3
S.R.	8	10·1	17	15·6	25	13·0
T.R.	13	16·5	29	26·6	42	21·5
D.	5	6·3	2	1·8	7	4·1
Untraceable	2	2·5	2	1·8	4	2·2
	79	100·0	109	100·0	188	100·0

A few observations should be made on our figures. In Figs. 1 and 2 the individual careers, in and out of hospital, are given of 101 of the female and 69 of the male patients, classified according to their final state. The patients omitted are those about whom sufficient information is not available to draw up accurate figures, i.e. those who died early, who were untraced, and a few others. From the figures a clear picture is obtainable of the variability of length of first and subsequent illnesses, of the frequency of relapses, and the

TABLE 3

	AVERAGE PERIOD OF TREATMENT IN MAUDSLEY HOSPITAL (MONTHS)		AVERAGE PERIOD OF HOSPITALIZATION (MONTHS)		AVERAGE PERIOD OF OBSERVATION (MONTHS)	
	M.	F.	M.	F.	M.	F.
T.R.	4	5	5·5	6·6	40·0	37·9
S.R.	3	5	5·0	6·8	33·1	39·4
S.D.	5	8	11·1	6·3	43·0	39·4
F.I.	4	4	11·9	9·9	42·6	36·4
H.I.	4	4	35·7	34·1	39·3	39·5
D.			5·0	8·0	5·2	15·5
Untraced			5·0	3·5	11·0	3·5
Average male ..			20·7		38·5	
Average female ..				18·2		38·7
Total Average ..			19·2		38·6	

distribution of long and short illnesses and relapses between the cases of good and those of bad prognosis, and the different amount of hospitalization in the different groups (for which see also Table 3).

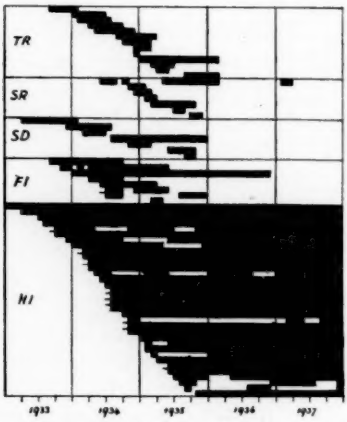

Fig. 1.—Males. Each horizontal line represents the career of a single patient. Black represents time spent in hospital.

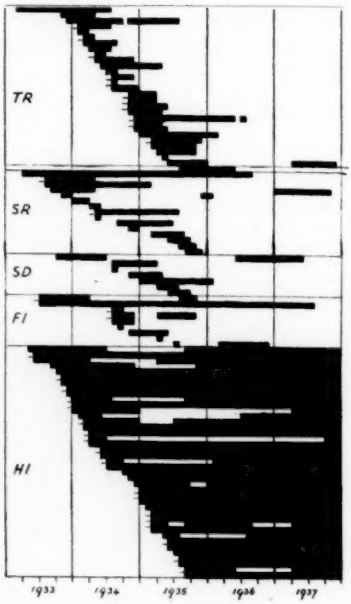

Fig. 2.—Females. Each horizontal line represents the career of a single patient. Black represents time spent in hospital.

TABLE 4

MONTHS AFTER 1ST ADMISSION TO HOSPITAL	STILL IN HOSPITAL, PER CENT.		RECOVERED, I.E. OUT OF HOSPITAL, FOR 1ST OR SUBSEQUENT TIME, PER CENT.		RELAPSED, I.E. BACK IN HOSPITAL, FOR 1ST OR SUBSEQUENT TIME, PER CENT.	
	M.	F.	M.	F.	M.	F.
1	94	93	6	7	—	—
2	82	85	18	15	—	—
3	70	78	29	22	1	—
4	67	69	30	31	3	—
5	62	65	34	35	4	—
6	53	58	43	41	4	1
9	47	44	47	53	6	3
12	42	36	48	60	10	4
18	36	29	53	67	11	4
24	36	28	53	64	11	8
30	36	28	50	61	14	11
36	35	28	49	60	16	12

Figs. 3 and 4 represent the curves of recovery of the male and female patients, and the essential data therein contained are given in Table 4. Both these figures and this table are based on the same reduced number of patients, about which full details are available. Both figures and table draw attention to the distinctly more favourable course of the psychosis in the female sex, as compared with the male. As will be seen from Table 5, the recovery rate, both from the first attack and from subsequent relapse, is greater in the female, and the relapse rate is lower. The same effect shows itself, of course, in Table 2.

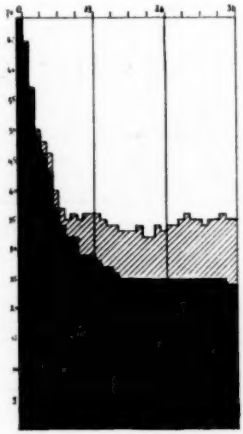

Fig. 3.—The curve of recovery in male patients. Every vertical line represents the number of patients recovered (white), relapsed (cross-hatched) or still ill (black) 1 to 36 months after the onset of the illness.

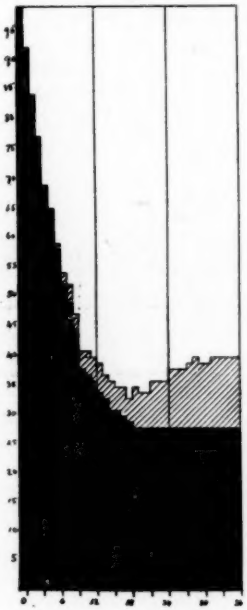

Fig. 4.—The curve of recovery in female patients. Every vertical line represents the number of patients recovered (white), relapsed (cross-hatched) or still ill (black) 1 to 36 months after the onset of the illness.

Of the males, 64·5 per cent. remained hospital or family invalids or recovered with defect ; only 26·4 per cent. made good social recoveries. Of the women, the corresponding percentages are 53·9 and 42·6 per cent.

TABLE 5

Of 69 *Males*, 44 were discharged from hospital	.. ..	=64 per cent.
Of these 44, 14 were subsequently re-admitted	.. ..	=32 ,,
Of these 14, 4 are at the end of 3 years out of hospital	.. ..	=28 ,,
Of 98 *Females*, 73 were discharged from hospital	.. .. ..	=75 ,,
Of these 73, 21 were subsequently re-admitted	.. ..	=29 ,,
Of these 21, 8 are at the end of 3 years out of hospital	.. ..	=38 ,,

Nothing certain can be said about the effect of age on the prognosis. Table 6 suggests that those whose illness begins at an age of 20 or less have a better prognosis than those who fall ill at a later age. The difference is, however, statistically not significant, though it might perhaps be regarded as suggestive ($\chi^2=4{\cdot}76$, for which P=slightly less than 0·2). The same thing is seen in Table 7 : the hospital invalids are distinctly older than the average of patients, other groups distinctly younger ; and this is true of both sexes. Owing to the wide variation in age of the patients, expressed in the standard deviations, the results, though suggestive, cannot be significant. A much larger material might well disclose that age does have some bearing on the prognosis.

TABLE 6.—PROGNOSIS AND AGE AT ONSET

AGE	H.I. AND F.I. :		S.D., S.R., AND T.R. :	
	NUMBER	PER CENT.	NUMBER	PER CENT.
20 and less	13	39	20	61
21–30	50	57	38	43
31–40	24	53	21	47
41–45	8	73	3	27

TABLE 7.—AVERAGE AGES

	M.	±	F.	±	TOGETHER	±
H.I. ..	26·8	7·0	30·0	7·8	28·6	7·3
F.I. ..	24·6	6·7	26·2	7·6	25·4	7·2
S.D. ..	25·5	5·5	27·7	6·2	26·5	6·1
S.R. ..	23·0	8·0	28·3	7·6	26·6	8·1
T.R. ..	23·6	6·1	27·2	7·5	26·1	7·2
All ..	25·6	7·0	28·6	7·8	27·4	7·4

But one other point is of interest. Of the 44 men who were discharged from hospital, one married and had three children. Of the 73 women, 9 married after discharge, and 12 children were born. The post-diagnosis fertility of schizophrenics does not seem, therefore, to be very great.

Discussion

Briner's results are compared with ours in Table 8, and it will be seen that they are on the whole more favourable, in spite of the much heavier mortality rate. Both his and our material are alike in containing only schizophrenics with an illness of less than a year's duration. The length of time which Briner's cases and ours have been observed also corresponds, since his cases were those in hospital April, 1933–July, 1936. The difference in the results may be in part due to the different way in which Briner arranges them—he has, for instance, two categories of social remission where we have only one. A more important difference lies probably in the nature of the material ; Briner has a large number (23 per cent. of the total material) of " agitated catatonics." These provided

about their due proportion (41 per cent.) of total and social remissions, but less than an average number of family and hospital invalids, and more than half his total number of deaths. This type of hyperacute case can be accommodated at the Maudsley, but only in limited numbers. We have not yet undertaken, as is projected, a closer clinical analysis of our cases ; but we anticipate that the percentage of disturbed and excited catatonics in our material will be substantially smaller than in Briner's. A third reason for the differences obtained may be the effect of treatment. Briner has made extensive use of continuous narcosis and also of a method of " Frühentlassung," by which patients are discharged from hospital at the earliest possible moment, often before full recovery is obtained, as a means of avoiding that stereotyping of symptoms which one often sees, or thinks one sees, in patients for long immured in a mental hospital. Briner states that of 33 cases where " Frühentlassung " was employed, 27 showed a good result. The actual effect of early discharge on his results is, however, not to be measured by this table.

TABLE 8

	BRINER :		MAUDSLEY MATERIAL :	
	NUMBER	PER CENT.	NUMBER	PER CENT.
H.I. and F.I.	82	31	95	51
S.D.	15	6	15	8
T.R. and S.R.	111	41	67	35
D.	37	14	7	4
U.	22	8	4	2
Total	267	100	188	100

TABLE 9.—BRINER'S MATERIAL

	TREATED BY CONTINUOUS NARCOSIS :		NOT SO TREATED :	
	NUMBER	PER CENT.	NUMBER	PER CENT.
T.R., $S.R._1$	19	43·2	53	26·4
$S.R._2$, S.D., F.I. ..	12	27·3	60	29·4
H.I., D.	13	29·5	88	43·7
	44	100·0	201	100·0

Briner also claims very valuable results from continuous narcosis, a method of treatment that was not at all extensively applied at the Maudsley in the years 1934 and 1935. Briner's tables bearing on this point are unfortunately not intelligible to us. From the original data provided we have drawn up Table 9, in which Briner's two degrees of social recovery are separated from one another. This arrangement is statistically the most favourable possible, and shows an

increase of 64 per cent. in the best class of recoveries obtained with continuous narcosis on the percentage obtained without such treatment. Though the difference is considerable the numbers are too small to have convincing statistical significance ($\chi^2=5{\cdot}273$, $P>0{\cdot}05$). We think, however, that the factor of treatment by this method also contributes to the difference between Briner's results and ours. It will be interesting to see whether, in the course of time, insulin and cardiazol treatment will be capable of producing a substantial improvement on either series of results.

Summary

1. A prognostically favourable group of 188 schizophrenics has been followed over an average period of over three years.

2. Of this group 41 per cent. are now in mental hospitals and over 50 per cent. are invalids at home or in hospital. Over one third have made total or social recoveries.

3. The course of the illness over the whole of the three years is illustrated by diagrams and the recovery and relapse rates during that period are given in tables. The influence of sex and age at onset are studied, and it is found that the prognosis in females is generally better than in males.

4. The results obtained are compared with those of other authors, and the possible influence of treatment by continuous narcosis is discussed.

We wish to thank Professor E. Mapother for permission to use the clinical material and the facilities of the Maudsley Hospital, and for his interest in our work. Two of the writers (M.-G., E. G.) have worked with the support of the Rockefeller Foundation.

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Addendum

Since this paper has been concluded further statistics have appeared which, however, differ so materially that discussion would exceed the bounds of a footnote. The reader is referred to various articles in the Psychiatric Quarterly for July, 1938 (Vol. 12, No. 3), and further to the Board of Control Report on Cardiazol Treatment and on the Present Application of Hypoglycæmic Shock Treatment in Schizophrenia by W. Rees Thomas and Isabel G. H. Wilson, London, 1938.

THE CORTICAL PROJECTION OF THE MEDIAL GENICULATE BODY

BY

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From the Institute of Anatomy, University College, London

(RECEIVED 28TH SEPTEMBER, 1938)

THERE are but few accounts of the study of the cortical distribution of the auditory radiation by means of lesions of the medial geniculate body. Apart from clinico-pathological studies in man, most of the investigations have been made by means of cortical stimulation and ablation.

In man and the monkeys there is general agreement that the auditory radiation ends in the superior temporal gyrus within the Sylvian fissure. The only point at issue is how much, if any, of the exposed surface of this convolution is reached by the radiation. The results, however, in the common laboratory animals—the dog, the cat, and the rabbit—are uncertain and discrepant.

Ferrier (1876) studied the cortical localization of hearing in monkeys, dogs, cats, and rabbits both by stimulation and extirpation. Amongst the several responses that occurred from stimulation he regarded pricking of the ears as the one most indicative of the auditory area. Bilateral cortical extirpation was performed, and taking every precaution to prevent arousing the animal's awareness through some other channel, hearing was tested by sounds made in various ways. Ferrier placed in the cat the auditory receptive zone, to which he gave in his account the number 14, in the superior part of the second arcuate gyrus, or gyrus ectosylvius medius, i.e. between the upper end of the pseudo-sylvian and the suprasylvian sulcus.

Munk (1878, 1881) removed in dogs the posterior portions of the second, third, and fourth arcuate gyri (or posterior suprasylvian and posterior lateral gyri), i.e. the cortical region immediately in front and behind the posterior limb of the superior sylvian fissure (the post-sylvian fissure of Owen). The dog is described as being in such a state that for three or four weeks after the operation it is deaf. It then becomes able to hear, but does not understand what it hears. In the cortical zone immediately above the pseudo-sylvian sulcus Munk placed "tactile awareness" of the ear. Mann (1896) stimulated the cortex in cats and rabbits. The area from which movements of the ear were most easily elicited corresponded with Ferrier's localization of the auditory zone.

Luciani (1884), who was very critical of the work of Munk, used, however,

the same methods on the same animals and concluded that the auditory area was much more extensive, reaching upwards into the parietal, downwards into the hippocampal, and backwards into the visual zone.

E. A. Schäfer (1888), repeated the experiments of Ferrier in the macaque monkey. He made bilateral ablations of the cortex, and, to be quite sure, removed still more temporal cortex than did Ferrier. At first the monkeys so operated upon seemed quite idiotic ; later, as they recovered from the operation, it would become obvious that they could still hear. Schäfer also asserted

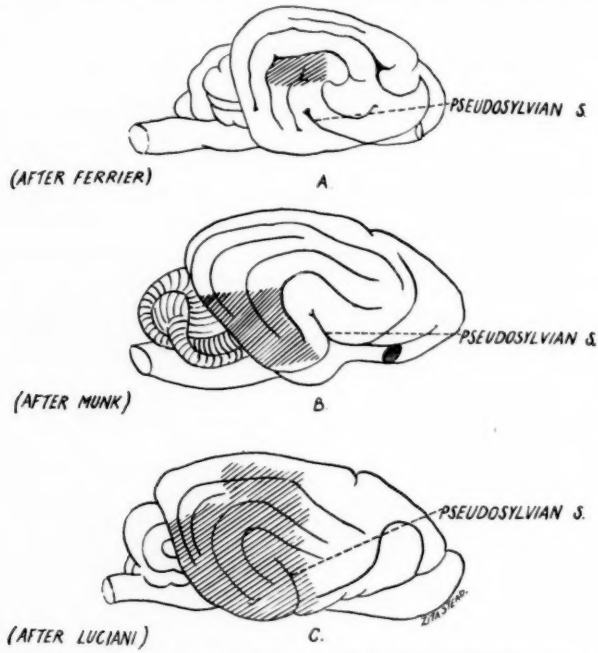

Fig. 1.—The cortical auditory receptive area in A the cat and B and C the dog, after various authors.

that when he stimulated the cortex he could not satisfy himself that pricking of the ears or associated reactions had any special relation to the superior temporal gyrus.

von Monakow (1895) removed in new-born kittens a cortical area which extended from the anterior ectosylvian fissure in front to the caudal margin of the hemisphere behind. Six months later atrophy over a considerable area, including the whole of the homolateral medial geniculate body, was found histologically.

This conflict of opinion suggests that the methods of stimulation and the search for functional deficiency after extirpation are not altogether suitable for the precise delimitation of the audito-sensory receptive field. It would seem, therefore, that little value could be given to the work of Larionow (1899),

who published a map of the auditory receptive area in the dog based upon its inability to hear a series of musical notes after the ablation of small cortical areas in the region of the posterior part of the suprasylvian fissure.

These ablation experiments upon dogs and other animals were repeated as newer methods became available. Amongst others the method of conditioned reflexes was used. Kalischer (1907), Swift (1910), Zeliony (1913), and Karplus and Kreidl (1914) all concluded that neither bilateral nor even complete removal of the cortex of both sides produced deafness in dogs and monkeys.

Various authors have claimed that they have confirmed Ferrier's localization of the auditory receptive zone by electrical and oscillographic methods. Leading off from this part, Larionow (1899), Kornmüller (1937), Bremer (1937), *et al.* have made electro-encephalograms from the exposed cortex in man and animals. From the comments made by Walters (1937) it seems that the deflections obtained from the cortex are so small that they cannot easily be disentangled from those of physical origin. It is apparently too soon to use this method as a means of anatomical exploration of the cortex. The method of cortical ablation permits of anatomical study of neural connections by retrograde chromatolytic effects. The Marchi method, of course, can be used to trace the degeneration of any tracts originating in the ablated area. Ohnishi (1931) made lesions in the cortex and in the medial geniculate body of rabbits. He describes ascending and descending fibre connections between the two structures. The tract from the medial geniculate body is said to end in the superior, middle, and inferior gyri of the rabbit's temporal cortex. In the absence of any figure depicting the area of termination precisely, this statement must be taken to mean that all parts of the temporal area as defined histologically receive the geniculo-cortical fibres. Mettler (1935) believes that a descending tract starts from the lateral surface of the superior temporal convolution and ends in the medial geniculate body. Our own experiments are of such a nature that they cannot be used to determine the existence of descending tracts to the medial geniculate body. Clark and Boggon (1935), Le Gros Clark (1936), Walker (1937), and Rundles and Papez (1938) *et al.* have investigated the effects upon the cells of the medial geniculate body after lesions of various parts of the temporal cortex in the monkey. By this method it has been shown that the greatest part of the medial geniculate body is connected with the superior temporal gyrus within the lips of the sylvian fissure. The only point at issue between these investigators concerns the problem whether a slender collection of large nerve cells (the nucleus parageniculatus), for the most part internal to the medial geniculate body, is or is not connected with the temporal cortex. Our own experiments have been carried out in such a way that they are of no use in solving the connection of the nucleus parageniculatus.

Present Experiments

In the course of producing electrolytic lesions in various parts of the central nervous system in a series of cats, it so happened that in two cats the lesion was so placed that the medial geniculate body alone was virtually destroyed. The

placing of the electrolytic needles in the brain was done by means of the Clarke-Horsley stereotaxic instrument, while the animals were under ether anæsthesia. The animals were killed twelve days after the lesion was made. The brains were removed and studied by the Marchi method.

The area destroyed by electrolysis measures transversely 2·5 mm. and occupies the anterior and medial aspect of the medial geniculate body. Thus the lesion is so placed that all of the geniculo-cortical fibres will be destroyed at their commencement, together with a part of the oro-dorsal nucleus of the medial geniculate body. The lesion being situated in the more medial part of

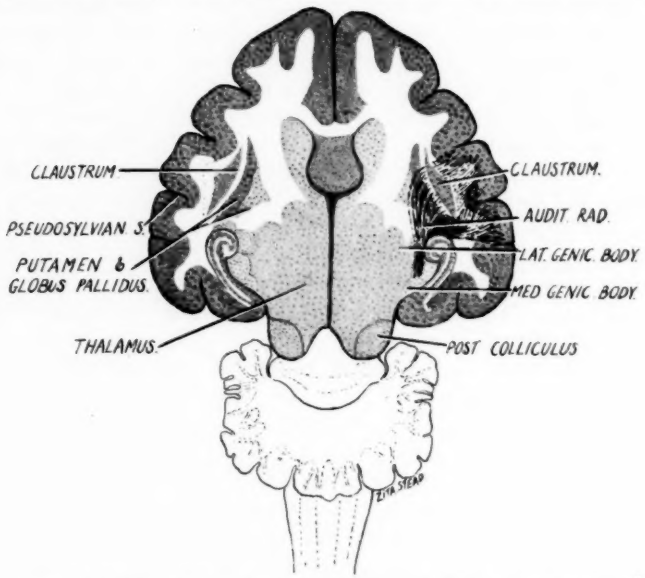

Fig. 2.—Scheme of the path of the auditory radiation in the cat's brain.

the medial geniculate body, it is possible that the ventral nucleus of the thalamus and the medial lemniscus may be slightly injured. Careful superimposition of the extent of the lesion upon the appropriate drawings in Winkler's Atlas (1914), and upon our own series of cats' brains stained for cell masses, together with a study of the fibre degeneration in the experimental brains themselves, shows that the lesions could have injured the thalamus only very slightly.

Observations

The study of the Marchi preparations may be described thus : the lesions and observations being almost identical, both experiments are described together.

Cortical fibres ; Degenerated fibres start from the place of the lesions and as they are traced forwards they come to occupy a field which is immediately caudal to the lateral geniculate body. While still in this position it becomes

possible for them to enter the white matter of the cerebrum. It is to be remembered that the rotation and displacement of the geniculate bodies which occurs in man owing to the great development of the pulvinar has not happened in the cat. The lateral geniculate body is dorsal and anterior to the medial geniculate body. The fibres fan out as they enter the white matter ; those coming from the more lateral part of the medial geniculate lie more lateral in the fan and reach the more caudal part of the cortex, the more medial

Fig. 3.—Photomicrograph of lesion in cat's brain at level of medial geniculate body. ×13.

lie in the front part of the fan and reach the anterior part of the cortex. The fibres from the more dorsal part of the medial geniculate reach the upper and those from the more ventral the lower part of the cortex. There is thus regularity and uniformity in the arrangement of the geniculo-cortical fibres, so that a kind of point-to-point relationship exists between the medial geniculate body and the cortex—a suitable anatomical basis for precise localization in the two systems.

The fibres from the medial geniculate body as they enter the white matter of the brain are covered by the optic tract as it nears the lateral geniculate body. The ventral fibres from the anterior part of the medial geniculate body traverse

the peduncle ; the others enter immediately the internal capsule, where they lie below the optic radiation.

Upon entering the substance of the brain some of the more anterior of the

Fig. 4.—Photomicrograph of degenerated fibres in cat. A. Auditory radiation passing through globus pallidus and putamen above and below claustrum. B. Part of auditory radiation lying between peduncle and optic tract. ×13.

radiating fibres traverse the globus pallidus and the putamen, reaching the posterior part of the claustrum. They arch backwards slightly as they travel round the posterior end of the claustrum to reach the cortex. Many of the fibres reach the cortex by passing caudal to the globus pallidus, putamen and

the claustrum. The upward spread of the fibres becomes much more acute as the cortex is approached, the most dorsal fibres running parallel with the cortex to reach their destination.

The extent of the cortical area in which these fibres terminated was defined by reconstructing the surface of the brain from serial drawings. It is as follows : posteriorly the boundary is the posterior ectosylvian sulcus ; superiorly the

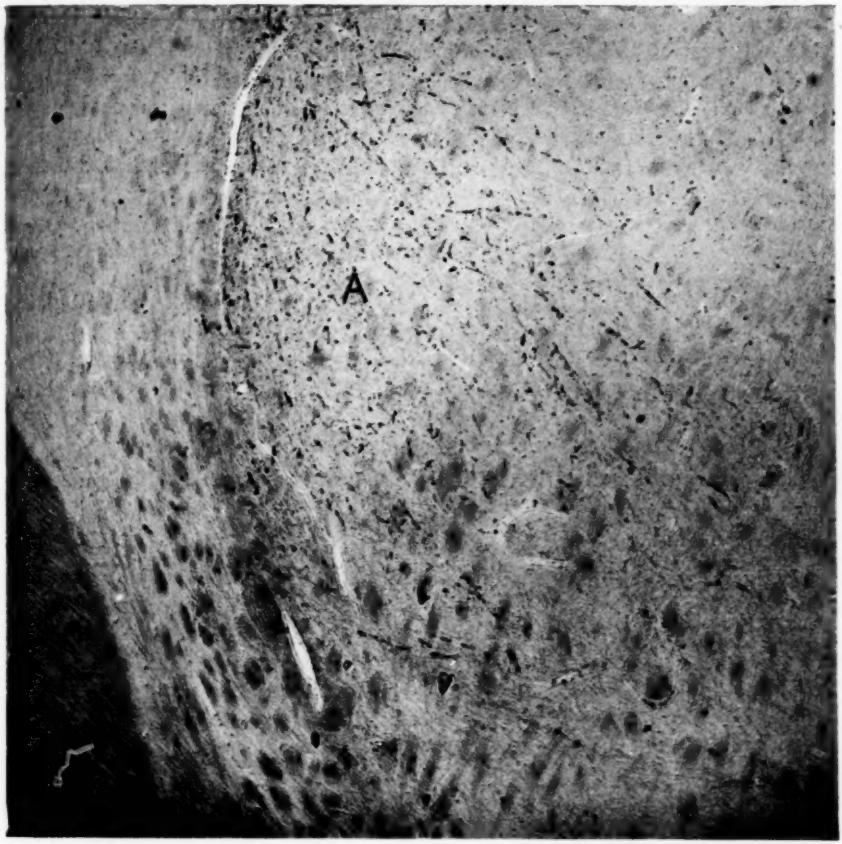

Fig. 5.—A. Degenerated fibres in the lateral part of the pars externa of ventral nucleus of thalamus, which have come from lateral part of mesial fillet. ×36.

suprasylvian sulcus ; anteriorly the anterior ectosylvian sulcus, though superiorly the degenerated fibres pass beyond this fissure slightly and below do not quite reach it ; and below the area ends a short distance above the rhinal fissure.

Involvement of other Structures.—There is no degeneration in Gudden's commissure. There is some reason to suppose that the fibres which form this commissure start from the cells of the ventral nucleus of the medial geniculate.

The lesions are so placed in these cats that they might be expected to involve at least some of these cells. The absence of degenerated fibres raises a slight doubt as to the correctness of the above view of the origin of Gudden's commissure.

In both experiments there is some slight scattered degeneration in the lateral portion of the ventral nucleus of the thalamus adjacent to the lesion. This is explained by the fact that at the actual site of the lesion a few lateral fibres of the medial lemniscus were involved. These degenerated fibres occupy the lateral portion of the pars externa of the ventral nucleus of the thalamus.

The electrolytic needles reached the medial geniculate body by passing horizontally forwards from the occipital region in the vicinity of the foramen magnum. In doing so an injury sharply localized to the nucleus cuneatus occurs in each cat. From this nucleus degenerate fibres can be traced in the

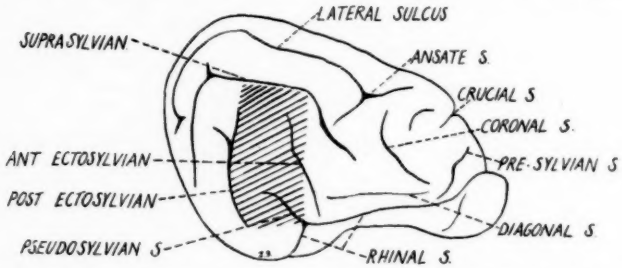

Fig. 6.—The cortical audito-sensory area in the cat as determined by the present experiments.

internal arcuate group across the middle line to the opposite side where they occupy a ventral position. A few go to the cuneate nucleus of the opposite side ; the rest pass medially and assemble about the inner extremity of the inferior olive. Eventually they can be traced to the more medial part of the pars externa of the ventral nucleus of the thalamus.

Two other negative statements perhaps should be made. A geniculo-thalamic tract has been postulated as a result of the examination of normal material : Rioch (1931), Glorieux (1929). The present Marchi preparations are appropriate for determining the existence of such a tract. None has been found.

The fibres which compose the geniculo-cortical tract from the medial geniculate body are entirely homolateral and none reach the cortex of the opposite side.

Comment

The limitations of these experiments have already been referred to. The lesions have been so placed that the fibres belonging to the region of the medial geniculate body described as the hilus have been severed.

Winkler (1921) has described the fibres of this hilus as containing not only the geniculo-temporal fibres, but also geniculo parietal and occipital fibres He describes the position of these in the field of Wernicke and their inter-

mingling with the optic radiation. In addition he says there are cortical components in this region which have come by way of the inferior or posterior brachium from the posterior quadrigeminal body. If these fibres exist in the cat and occupy the positions assigned to them by Winkler, they must have been included in the lesions and their cortical distribution would have been disclosed in the Marchi preparations. Only geniculo-temporal fibres have been found. These experiments in the cat do not, of course, decide against the origin of cortical fibres from the posterior quadrigeminal body. However, experiments upon the guinea-pig in which the posterior quadrigeminal body was destroyed show no degenerated fibres going to the cortex. We conclude that fibres from the medial geniculate and posterior quadrigeminal body to other parts of the cortex do not exist.

The actual cortical area assigned to the auditory radiation is bounded on all aspects by fissures constant in the cat's brain. If we assume that the meaning of fissures is to be found in the limit they prescribe to homogeneous functional areas, then it is satisfactory to such a theory that the auditory area is so circumscribed. The precise localization of the auditory area is obviously of importance in the study of the problem of fissuration in general.

The strict homolaterality of the auditory radiation makes it necessary to assume that the bilaterality of hearing depends upon the crossing of fibres either at the level of the medial geniculate bodies or in the course of the auditory tracts which reach these.

It might be expected that the auditory receptive area having in general a uniform sensory receptive function might be constructed in a uniform histological manner. Reference to the literature upon this matter reveals much discrepancy and difficulty. As a result of these experiments and of microscopic studies of the cat's cortex we are able to assert that it has got a uniform, easily recognizable histological pattern. It is hoped to make a subsequent communication upon this problem of cytoarchitectonics.

In the list of the findings reference has been made to certain lesions of the mesial fillet, one of its lateral fibres in the mid-brain and the other in the cuneate nucleus. From the course of the degenerated fibres it can be inferred that the fibres from the cuneate nucleus which represent the upper or fore part of the body occupy the medial part of the mesial fillet, a position they acquire as they cross the middle line in the medial arcuate fibres. When the pars externa of the ventral nucleus of the thalamus is reached, these fibres end in its medial part. This observation is corroborated by the injury of the lateral part of the mesial fillet, the degenerated fibres of which go to the lateral part of the pars externa of the ventral nucleus of the thalamus. Le Gros Clark (1936 *b*) has presented the results of his own experiments upon the termination of the mesial fillet in the thalamus, and analysed the literature which bears upon this problem. It will be found that the results we have recorded are in agreement with the conclusions of Le Gros Clark.

In man and monkeys Pfeiffer (1920) and Poliak (1932) both describe the spiral twist which occurs in the fibres of the auditory radiation near the cortex, and the angulation of the fibres at their commencement due to the ventro-

lateral displacement of the medial geniculate body. Neither the spiral twisting of the fibres nor the angulation is present in the auditory radiation of the cat. The only obstacle the radiation encounters in the cat is the claustrum. The fibres penetrate readily the globus pallidus and the putamen. They go above or below or behind the claustrum, but not through it. As already mentioned, many of the fibres go behind the claustrum.

Summary

The distribution of the auditory radiation has been studied in the cat by the Marchi method after electrolytic lesion at its origin from the medial geniculate body.

It has a strict homolateral distribution to the cortical area, bounded in front approximately by anterior ectosylvian fissure, behind by the posterior ectosylvian, above by the suprasylvian fissure, and below ending a short distance above the rhinal fissure. It is traversed axially by the pseudo-sylvian fissure.

There is no angulation or spiral twisting of the fibres of the auditory radiation.

The termination in the pars externa of the ventral nucleus of the thalamus of the mesial fillet is such that the fasciculus cuneatus occupies its more medial part.

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A CRITICAL REVIEW

NARCOSIS THERAPY

BY

R. D. GILLESPIE

TREATMENT by continuous narcosis implies the use of narcotic substances to induce sleep for the greater part of 24 hours, each successive day, for periods ranging up to 14 days and occasionally longer. The expression " continuous " is a misnomer, since a break is always allowed in the 24 hours, during which nourishment is given and the evacuations attended to.

History

Griesinger (1882) says that with the use of ether and chloroform, complete and rapid recovery has occurred in several cases of recent melancholia, but he adds that relapse occurs and " with each inhalation the remission gradually shortens until they can no longer be obtained." McLeod (1900) reported recoveries following the use of massive doses of bromide in acute mania. Williams (1845) quotes Adral and Van Swieten as having seen maniacal states cured by accidentally large doses of opium. Sir Thomas Clouston (quoted by Palmer, 1937) mentioned keeping large " numbers of cases under " (the influence of chloral) " day and night for weeks, and many of them certainly got well," adding : " But I do not believe in it so much now." Wolff (1901) used trianol in three cases of " acute confusional insanity," the treatment lasting 12 days, with two recoveries and some temporary improvement. Later in the same year he treated three cases with one recovery. Epifanio (1915) treated a mixed group of 10 cases, which recovered or improved following treatment. Kläsi (1922) published a report on which most of the subsequent work has been based. He used somnifaine, and treated 22 cases, mainly of schizophrenia, with three deaths. Since his paper the Zurich school has specially interested itself in the treatment, and has devoted itself to an elaboration of the technique, with the object especially of eliminating the dangers suggested by Kläsi's three fatalities. The Zurich patients so treated have been nearly all schizophrenics. The chief publications of the school have been those of Oberholzer (1927), Lutz (1930), and Monnier (1936). Müller (1925) collected 311 cases treated by various authors, with 15 deaths. This percentage of fatalities has been misleading, since the largest proportion of deaths occurred in the smallest series, i.e. at the hands of the least experienced therapists. Barkas and Dawson (1929) using somnifaine reported unfavourably on the treatment, saying

that any improvement was transitory ; but Ström-Olsen (1933) points out that they used smaller doses than others found necessary (2 c.c. per day compared with 5 or 6 c.c.) and for a shorter time (4 or 5 days instead of 10 to 14 days). Lutz used luminal or dial, treating 13 cases with the former and 45 cases with the latter. Oberholzer (1927) treated 92 cases, including 186 courses of treatment of which 138 were with somnifaine and 48 with luminal. Monnier (1936) used Cloetta's mixture (*vide infra*), introduced by Cloetta and Maier at the Zurich clinic in 1934. This was an attempt to produce a balanced hypnotic with the object of eliminating the complications attributed to the use of a barbiturate alone. With the same object Ström-Olsen and McCowan (1934) while retaining somnifaine gave also glucose 1 oz. by mouth and insulin 15 units by injection with each dose of somnifaine. Palmer (1937) used somnifaine and paraldehyde, on the principle of using both a hypnotic which according to Pick's classification acted mainly on the brain-stem and one (paraldehyde) which acted mainly on the cortex.

Much the greatest amount of work, therefore, has been done with barbiturates, of which somnifaine has been the most widely used. Attempts have been made to make the treatment safer by using either a different barbiturate or an admixture of other drugs, of which paraldehyde has been the most frequent. Paraldehyde has been used primarily because it is considered to be safer than barbiturates on account of the general physiological properties. Paraldehyde has therefore been substituted for a portion of the barbiturate that would otherwise be necessary, in the hope of maintaining the prolonged type of sleep that is obtainable with a barbiturate, while avoiding the dangers of a larger total dose of barbiturate alone.

Theories

Presumably the earlier attempts at treatment were based on the assumption that the mere interruption of a habit of the nervous system or the introduction of a period of rest in an excited state might be expected to have favourable results. This might be regarded as the naïve view ; but it is clear that advances in knowledge of the physiopathology of the conditions treated have been insufficient to enable any more penetrating theory to be established. In fact, more might be expected to be learned about the physiopathology of psychoses from the phenomena of prolonged narcosis than in the opposite direction.

The vogue for continued narcosis dates from Kläsi's paper (1922), and the theories as to its therapeutic action have followed the two lines indicated, the psychopathological and the physiological, but with wide divergence from the original hypothesis, especially on the physiological side. Kläsi believed the effect to be largely psychological, the patient's weakness during and immediately after the treatment producing a need for help, which was given in the form of simple psychotherapy. He thought also that an anæsthesia was produced whereby stimuli of peripheral or central origin were blocked or obliterated. Cloetta had suggested that in an ulcer centripetal impulses passed to the spinal cord, and reflexly set up centrifugal impulses which impeded the healing process,

and Kläsi suggested a similar process in psychoses—affective excitement causing restlessness and vice versa. Kläsi quoted E. F. W. Rollers on the effect of an increased acuity of perception of movement, and he considered that parasthesiæ could be the foundation of hallucinations and delusions. He admitted that the isolation to which the patient was submitted during the treatment might play a part. He speculated also on the possibility that an alteration in the brain circulation might be induced by the treatment.

Maier (1934) emphasizes the importance of the psychotherapeutic effect. He considers the " rapport " induced to be of the first importance, and says that this is impossible if the treatment is carried out in an open observation ward. Oberholzer considers psychotherapy important and stresses the necessity for a special nurse. Others have pointed out that psychotherapy is not necessary. Meerloo (1933) and Palmer and Braceland (1937) limit their psychotherapy to simple encouragement. Oberholzer (1927) does not consider the helplessness stressed by Kläsi as important, but he lays stress on the " affective loosening " —the dreamy mental state which precedes or ensues upon the deeper state of narcosis. Ström-Olsen remarks that this can hardly be applicable to the effect in manic patients. In the dreamy or " dissociated " phase the patient becomes more accessible, women become like children or become more erotic ; and in general a new orientation is gained to the psychosis and to the outside world.

Furrer (1924) attempted to state the hypothetical process in psychoanalytic terms when he said that in drug narcosis complexes were relieved of their excess charge of libido, so that afterwards the ego could assert itself better. Boss (quoted by Palmer, 1937) regarded the ego as a " functional psychic organ " for the differentiation and maintenance of which a certain degree of mental energy is necessary ; and sleep as resting the forces which maintain the ego.

On waking, according to Oberholzer, the patient realizes the abnormality of the psychotic symptoms, and finds it troublesome to remember them. Oberholzer also criticizes the theory of interruption of impulses by the anæsthesia induced. Monnier concludes that the method works psychologically in the sense that the patient becomes very suggestible. He bases this conclusion on the fact that the best results (18 social recoveries out of 24 cases) were obtained in schizophrenics with what may be regarded as preponderatingly psychogenic states of excitement—hallucinatory anxious states, with sleeplessness, nervousness, and headaches " which made an impression of psychogenesis." He attributes some of the effect to the change of environment and to the fact that they received more attention from the doctors after the cessation of the narcosis.

Physiological Theories.—On the other hand Monnier concludes that the effect must be mainly physical, because of the results obtained in acute " maniform " and catatonic excitements, as well as in chronic depressions and schizophrenic-catatonic psychoses, which he obviously regards as essentially " organic " in origin. Monnier suggests that the treatment is effective because it exalts the parasympathetic system and depresses the sympathetic. The cases which showed this exhibited also the best remissions, while on the contrary catatonics which showed hypersympathicotonia improved only slightly. He adduces the opinion that the mental disturbances are dependent on changes

in the vegetative nervous system, and concludes that the barbiturates produce their effect through their action on the vegetative centres in the diencephalon. Meerloo shares this view and considers from his experience that it is not necessary to produce actual sleep.

Müller (1927) considered that the effect must be mainly pharmacological, since disregard of the precautions of a darkened room, etc., made no difference as to the results. He concluded that actual anæsthesia played no part, but the grounds for this conclusion seem inadequate. As an additional support for the theory of merely pharmacological action he adduced the fact that the clinical alteration for the better might not appear till several days after the cessation of the actual narcosis. He also pointed out that the condition of a manic patient after cessation of the treatment was not so good, i.e. the patient felt less well than during spontaneous recovery, as if some toxic or physiological abnormality of the tissues remained. The fact that, as some authors, e.g. Lutz and Ström-Olsen, believe, sleep deep enough to produce complete amnesia for the period of treatment is necessary, is to be construed as suggesting a physiological rather than a psychological explanation, since the depth of the amnesia is to be taken as evidence of the depth of the narcosis.

Quastel and Wheatley (1932) have shown that narcosis appears to depend on interference with the oxidation in the brain of substances important in carbohydrate metabolism, especially glucose, lactic acid, and pyruric acid. They have demonstrated that there is a parallel between the narcotic power of a drug and its inhibitory effect. This seems to speak for a cortical anæsthetic effect or for an interruption of neuronic habit. As to the details of physiological action, Magnus (1936) suggests that the resulting ketosis produces relative dehydration of the brain cells, and that this ultimately favours oxygenation. This would be a comprehensible view if the essential cellular physiopathology in psychoses is an anoxæmia. Narcosis would then be effective by stimulating the cells to a reversed effect—of hyperoxidation after a state of suboxidation. Lowenthal (quoted by Ström-Oslen and McCowan) suggests a biochemical explanation, and that the effect depends on improved cellular oxidation, which Lorenz attributes to the surface action of the barbiturates. But one of the effects of the barbiturates is usually considered to be the inhibition of oxidation on all surfaces.

Palmer and Braceland (1937) quote Sakel's theory regarding the modus operandi of hypoglycæmia—the normal impulses are conceived to be suppressed and the normal activated. Ström-Olsen and McCowan suggest that both a twilight stage and a narcotic stage are necessary : the former by facilitating the discharge of tension from repressed complexes (Oberholzer and Furrer) and the latter by producing actual anæsthesia. Palmer (1937) also suggests that the sudden withdrawal of narcotics after their prolonged use might be a factor, but sudden withdrawal is purposely avoided by others, including the Zurich workers. Nevertheless, when sudden withdrawal produces a convulsion, as sometimes happens, the analogy with the convulsion therapy of psychoses by means of cardiazol suggests a possible mode of therapeutic action.

Hypothetical Localization of Action.—The predilection of some authors for

placing the seat of action in the subcortical, especially the diencephalic centres, is explained by the now traditional use of barbiturates in this method of treatment. It has been mentioned that the barbiturates act principally on the brain stem, because it is in this region that they are found in greatest concentration after death in animals killed during barbiturate intoxication (Keeser 1927). But Sollmann (1936) considers that this merely expresses the ratio of distribution of white matter between cortex and brain stem. Müller supports the theory of a direct action on the brain stem by instancing the presence of hæmorrhages there, increase in the blood sedimentation rate, and changes in the leucocyte count as evidence of action on the vegetative centres. Hadfield (quoted by Palmer) states that various autonomic pictures are reversed during narcosis, e.g. hyperchlorhydria becomes achlorhydria and vice versa. Hess (quoted by Monnier), suggests that the important effect is on the sleep centre in the diencephalon.

There can be little in the view of barbiturate specificity, since bromide and trional have both produced like effects ; and it does not seem likely that there is a specific regional effect, or at least that a specific regional effect is a preponderating factor, since bromide is a cortical rather than a subcortical sedative, if Pick's regional classification of hypnotics be accepted. It is conceivable that the manner of action is different with different psychoses ; and that while preponderatingly physiological anæsthesia with interruption of faulty neuronic habit is the important factor in states of excitement, whether " maniform " or schizophrenic, " affective loosening " or liberation of pent-up affect may be the effective factor in depressions and inhibited states generally. Monnier attributes the results in the psychogenic disturbances of psychopaths to the psychological effects.

It may be also that in excited states the cortex is chiefly involved and in inhibited states the brain stem. Pavlov's dog, in which had been induced a state of excitement as the result of confusion of conditioned reflexes, was restored more rapidly with the help of bromide than with rest alone. On the other hand, the subjective experiences of catatonic patients who have been given a dose of sodium amytal and come temporarily into contact, i.e. became accessible and willing to talk, suggests that their consciousness is quite clear during the catatonic state, but that they are held in a kind of vice which inhibits movement of any kind. The analogy with the immobility induced in experimental animals by bulbocapnine, which affects basal cerebral structures, is suggestive.

In general, the theory of the action of continuous narcosis suffers from the complete uncertainty as to the physiopathology of the morbid conditions to which it is applied. Those who have spun these theories have never taken a comprehensive view of the possible factors—factors which may operate at different levels of physiochemical and neuro-physiological complexity. It is of great value to know that narcotic drugs act at the physiochemical level by inhibiting oxygenation. The cognate speculation that the resulting stage of ketosis may be followed by a reverse state, in which oxygenation is favoured, is suggestive of the way in which a narcotically-induced accentuation of a pre-existing anoxæmia may result, when the narcotic is withdrawn, in a stimulation of a function which was previously at a subnormal level. But the nervous

system is more than a simple combustion engine : its internal energy exchanges are of an electrical kind rather than simple combustion. Moreover, the exchanges can occur in more or less localized fashion : and an electrical (ionic) charge in one part of the nervous system may, by some kind of induction, produce an opposing charge in an adjoining part. In other words, processes of excitation and inhibition accompany one another throughout the nervous system, and exhibit the behaviour or laws which Pavlov especially has deciphered.

Unfortunately, psychotic syndromes are not conceived in neurophysiological terms ; but it is possible that a reclassification, primarily into states of excitement and states of inhibition, might serve as a first step to their comprehension along neurophysiological lines. If this rough subdivision were adopted—a subdivision into which admittedly it would strain the facts at present to attempt to fit many types of psychoses—it would give a possible basis for the understanding of the action of prolonged narcosis. This suggestion is supported by the work of Serejski and Feldmann (1937), who chose only chronic cases of schizophrenia, especially those with sleep disturbances at night and sleeplike disturbances of consciousness during the day. They divided schizophrenic psychoses into two types : (*a*) types under 20 years of age, the classical Kraepelinian dementia præcox ; and (*b*) inhibited or " hypnic " forms occurring at an age between 30 and 40, and resulting from factors such as psychic trauma, infection, auto-intoxication and fatigue, producing fatigue of the central nervous system. They adduced Pavlov's hypothesis that the central nervous system, in severe states of exhaustion, tries to protect itself by inhibition, *i.e.* by setting aside all work exceeding its capacity. The narcotic then is presumed to work by protecting the brain from stimuli beyond its strength to deal with, and by hindering all the conditions which favour the appearance of Pavlov's " ultraparadoxical phase." In states of excitement, on the other hand, it may be supposed that the narcotic works by favouring the inhibitory process, the drug giving an opportunity for the healthy balance of inhibiting and excitatory processes in the central nervous system to be restored. It is conceivable that in inhibited " depressed " states, the narcotic acts by inhibiting a hitherto persisting inhibition, with a similar result. The fact that some states of excitement are due to release of lower centres from inhibition by higher levels of activity, suggests the possibility that the inhibition by the drug of the released excitatory process may give time for inhibition of the lower by the higher to be restored.

The theoretical implication of the effects of emotional catharsis have also not been sufficiently studied. It is well known clinically that the verbal and sometimes other muscular expression of emotion connected with a constellation of ideas is followed by an alteration in or disappearance of certain symptoms. Something similar happens under the influence of narcotics ; the patient who has been unable to talk becomes loquacious, and subsequently may improve considerably. This has often been observed, e.g. by Horsley (1936) and Campbell (1938) in the case of single doses of barbiturates in inhibited (depressed inhibited, or actually stuporous) patients. There are depressed patients who are able to talk readily about everyday matters, i.e. on matters with no emotional

" charge " : but who become completely inhibited when emotional topics are touched on. There is a localized inhibition induced by the emotional " charge." It is conceivable that such inhibition may spread to all topics, with the resulting appearance of depression or even stupor. Continuous narcosis may work in the psychogenic cases by facilitating the release of emotional tension, e.g. by inhibiting the inhibition set up by the emotional charge.

Drugs Available

McLeod used bromide salts : the primary disadvantages being the very large dose required, the toxic by-effects, and the difficulty in regulating the dosage on account of the slow absorption and excretion. Wolff used trianol in 1901. With trianol, Oppler (quoted by Lutz) found that out of 18 cases eight could not be sufficiently narcotized, while three developed acute nephritis and a further three had cylindrical casts in their urine. The introduction of the soluble salts of veronal gave the opportunity of producing quiet sleep of long duration. Many of the more recently introduced barbiturates are rapidly excreted. Ström-Olsen and Quastel describe somnifaine as an alcohol-glucose-aquæous solution of the diethylamine salts of veronal and allylisopropylbarbituric acid. Somnifaine is not diethyldiallylbarbituric acid, as has sometimes been described. One ampoule of 2 c.c. he calculated as equal to 5¼ gr. of veronal. Kläsi used scopolamine at the beginning of the treatment to help to establish the narcosis.

Other barbiturates have been used, or other combinations of barbiturates with other drugs. Claims are made for superior safety with the newer methods, but the impression obtained by a perusal of the foundations of the claims is that it is experienced care that counts together with thoroughness, rather than the particular drug or combination of drugs utilized. In 1928 dial (diallylbarbituric acid) was introduced ; and Lutz in 1930 described 13 cases treated by luminal and 45 with dial. He claimed that dial had less effect on the blood pressure than veronal and luminal and that it was more harmless and more effective than luminal.

In 1930 Maier introduced a mixture compounded by Cloetta, afterwards called Cloettal. The principles of which this was compounded were combined action on cortical and basal structures, minimum depressive effect on the circulation, and avoidance of the effects seen after withdrawal of pure barbituric medication. Cloetta enumerates the following desiderata : the hypnotic chosen must be able to be given intravenously, intramuscularly, or rectally, so as to avoid the danger of aspiration. It must have no depressing effect on the circulation. He pointed out that barbiturate derivatives, like somnifaine, have with long administration of large doses a tendency to produce slowing of the circulation, with congestion in certain localities, febrile disturbances, pneumonia, and anuria. Their use also tends to be followed by states of excitement on the final withdrawal of medication. He excluded intravenous injection on account of hæmolysis and intramuscular injection on account of the danger of local irritation, and preferred a solution capable of rectal administration. The solution ultimately compounded contained in each c.c. : paraldehyde, 0·4864 gm. ; amylene hydrate, 0·1593 gm. ; chloral hydrate, 0·1157 gm. ;

alcohol (92 per cent.), 0·1747 gm. ; allylisopropyl, barbituric acid, 0·0409 gm. ; digalin, 0·0830 gm. ; ephedrine hydrochlor, 2·4600 gm. The last was introduced to counteract depressant effects on the circulation. The proportions are so arranged that the quantities of barbiturates are held to balance the quantities of other hypnotic present. The standard solution is shaken to a clear solution with 10 times its volume of water. This is given rectally and induces sleep in 15–20 minutes.

The routine adopted by the Zurich school differs to some extent from the usual methods since nothing is given by mouth, but the precautions used are a fair sample of those necessary. Dilution is done with 4 per cent. glucose to which is added 1 gm. soda bicarb. per litre or a 0·5 per cent. solution of sodium chloride may be used instead. The minimum lethal dose is 3·6 times the minimal hypnotic dose in rats. The hypnotic dose is 0·15 c.c. of the standard solution per kilo, but it can be increased to 0·30 per kilo, although this is never necessary.

Meerloo prefers his " Solutio Barbamidoni " : 100 mgrm. phenyl-ethyl-barbituric acid ; 100 mgrm. diallyl-barbituric-acid ; 50 mgrm. dimethyl-amido-antipyrin ; 150 mgrm. phenyl-cinchonic acid ; 100 mgrm. caffeine sodium-benzoate ; ¼ mgrm. strophanthin cryst. (optional), dissolved in 2 c.c. alcohol-glycerin-water, consisting of glycerin 350 c.c., distilled water 130 c.c., alcohol to 1 litre.

Rectal Method.—The Zurich workers give no food or even fluid by mouth. Patients who have had to be artificially fed for a long time before are avoided if possible ; but where the treatment is undertaken, in such a case, for several weeks previously he is given fresh vegetables. A quiet dark room is essential. In the morning, by rectal injection, the first dose is given—0·15 c.c. per kg. of body weight. Every three or four hours, by rectal drip infusion, 400 c.c. of 5 per cent. glucose solution are given day and night—except that on one occasion in the 24 hours this is replaced by 400 c.c. physiological salt solution. The rectal administration of hypnotic is repeated as often as the patient gets restless and the depth of sleep appears to decrease. An attempt is made to maintain the sleep by repeating only half the original dose. In the first three days the mixture has to be given three or four times a day, thereafter only twice as a rule. Strict record is kept of temperature, pulse, breathing, stools, and urine. If the temperature goes above 37·5° C. in the axilla the fluid intake and diuresis are usually found to be insufficient. Subcutaneous saline infusion especially brings the temperature down, showing that the fever has been due to dehydration. Higher temperatures are an indication for breaking off the treatment. Sponging with cold water will often bring down the temperature. The patient should go to stool at least during the second day ; if he does not an enema of liquid paraffin or an injection of peristaltin is given. For a weak or irregular pulse, strophanthin ¼–½ mg. or 20–40 per cent. glucose is given intravenously.

After stopping the hypnotic, full awakening takes place in one or two days without any symptoms of deprivation. Then comes the time for psychotherapy. A special nurse for the entire day is fundamentally important. Removal to a

general ward with mild occupation for body and mind are indicated. Visits of relatives and friends are good. But this, of course, must depend on expert knowledge of the relatives' and friends' attitudes to the patient. Discussion of the patient's symptoms is bad. He should be encouraged to dwell on the days before his illness to establish his confidence, and Meyer recommends an early return home, within two weeks, to avoid the patient falling back into his schizophrenic autism.

Magnus (1936), who adopted the Zurich technique but used dial, isolated the patient for 48–72 hours beforehand, premedicated him with digitalis, and prepared him in general as for a major operation. He emphasized the importance of instilling confidence. He gave dial by rectum, introduced through a side-junction in a drip infusion tube, using 3 or 4 c.c. of a solution which contained 1½ gr. dial in 1 c.c. The dose rose as high as 15 gr. on the third day and was maintained at 6–12 gr. a day. To enable less dial to be used, morphia and scopolamine was used for the first three days. The patient was turned from side to side every two hours.

When infection was suspected, a leucocyte count was made and the blood sedimentation rate estimated. The patients were provided with a pneumonia jacket. Palmer and Braceland (1937), who used sodium amytal, advocated a preliminary search for and elimination of foci of infection. They also give a preliminary dose of sodium amytal in case of idiosyncrasy. Urotropin is given by Monnier as a routine to prevent bladder complications. Drops of zinc solution are instilled every second day into the conjunctival sac.

The continuity and depth of sleep vary not only with different patients, but with different authors. Thus, while Ström-Olsen claimed that with an average dose of 5 c.c. somnifaine daily the patients could usually be kept asleep most of the time, Ostlind (1936–7) using the same method, found that his patients were as much awake as asleep ; the rates being hours sleeping : hours awake or dosing as 153 : 156. It is true that Ostlind did not use the proprietary " Roche " preparation, but " isofen-astra," which is supposed to be chemically identical.

Quastel and Ström-Olsen (1933) claimed that by giving 50 gm. of glucose and 10 units of insulin with each dose of 2 c.c. of somnifaine, ketosis could be eliminated, as borne out by the disappearance of acetone from the urine ; by the absence of signs—cyanosis, coldness of extremities, and vomiting—which they attributed to ketosis ; and by a generally " smoother " course.

They claimed also that by this method mortality risk was well reduced. The risk is not, however, eliminated, since Parfitt (1936) using this method recorded three deaths in 66 cases.

Kläsi used scopolamine and morphia at the beginning, to help to induce quiet and the first sleep ; so also did Oberholzer, especially in agitated cases, but most workers have since dispensed with this.

Intravenous Method.—This has been used when it has been difficult or impossible to induce sleep by oral or rectal administration, but as Oberholzer points out, it is just in these cases in which it is difficult to induce sleep that it may be dangerous to flood with somnifaine.

The following is a sample of the more usual method in which nourishment

is given by mouth. In this régime (Palmer, 1937) somnifaine is supplemented by paraldehyde. The morning dose of somnifaine is given at 9 a.m. and the evening dose between 4 p.m. and 7 p. m. A dose of somnifaine is never given until eight hours have elapsed from the previous dose. If the patient is wakeful in the intervening period, paraldehyde is given instead. A more or less fixed amount of somnifaine is used and a variable amount of paraldehyde is used to maintain narcosis. In this way, it is claimed, the danger of accumulation of barbiturate is avoided. Nevertheless, Palmer occasionally found it necessary to give somnifaine at 1 a.m. as well. Somnifaine is injected intravenously ; paraldehyde is given either by mouth or by rectum or even intramuscularly. Palmer followed McCowan and Ström-Olsen in using insulin and glucose. Nursing attention is given mainly in two periods, 8–9 a.m. and between 5 and 6 p.m. The patient is got out of bed and made to walk at least 25 paces, and during that time he is engaged in therapeutic (i.e. encouraging) conversation. At least 60 oz. of fluid is given in the 24 hours, consisting of milk, barley water, and sweetened lemonade. In the milk are two eggs daily and ¼ oz. butter. No patient is allowed to go more than 24 hours without moving his bowels or receiving an enema. The urine is tested twice a day for acetone or ketone bodies and the total quantity measured.

The patient is nursed in a pneumonia jacket. Any nurse who has a cold is excluded. The patient is seen once every quarter of an hour. The temperature of the room is kept at 65° F. The patient is given a tepid friction twice daily. He is not allowed to lie for more than six hours in one position. " Particularly quiet " patients are given an inhalation of O_2 95 per cent. and CO_2 5 per cent. twice daily (Palmer).

The Zurich workers are emphatic that treatment can only be carried out safely with a specially trained staff and in a special institution. The personality of the nurses is considered to be very important during the treatment (Palmer, 1937) and afterwards to facilitate the simple psychotherapy that is required (Maier, 1934).

Duration of Narcosis

This ranges from 4 to 5 days (Kläsi, in some cases, and Barkas and Dawson) to as long as 22 days (Palmer and Braceland) or even 27 days (Demole, 1921). Kläsi gives 7 days as an average duration of treatment. Müller advises 7. Palmer and Paine (1932) 9, Segerath (1931) 12, and Ström-Olsen 14. Oberholzer contradicts those authors who suggest that the danger increases with the duration of the narcosis. Broder (1936) disapproves of a set standard, maintaining that a more flexible method enables the physician to choose the best time for psychotherapy. Monnier declares that the more one is dealing with a " process-schizophrenia ", the longer the treatment should be (at least 16 days), while with psychogenic excitements 4 days may be enough. On the whole the satisfactoriness of the results appears to be greater with longer treatment (10 days or more), and with larger rather than smaller doses, i.e. where the patient is kept decidedly under the influence of the drug all the 24 hours.

Some cases, especially psychopaths, show excitement rather than sedation

(Meerloo). Some developed catalepsy. After cessation of the treatment, fits have appeared (Meerloo, Palmer, and Braceland) but are possibly of therapeutic value. In some patients cessation of the treatment is followed by increase in the psychotic symptoms, above the pre-narcosis level.

Complications

Palmer (1937) has divided these into : (1) " Natural accompaniments," i.e. physiological consequences of the use of barbiturates, e.g. inco-ordination. (2) " Tissue-reactions " which he exemplifies with bradycardia, extreme flaccidity of the muscles, and transitory œdema. (3) Accidents, e.g. nerve palsies, fractures. (4) True complications—due to intolerance or excessive doses. Dangerous complications can arise in the course of treatment, and the utmost vigilance is required. They are principally cardiac, respiratory, and urinary. They have been attributed to a general interference with oxidation as the result of the action of the barbiturates ; and it has been held that the simultaneous administration of glucose and insulin obviates this (Ström-Olsen and McCowan). The avoidance of these complications is, however, more a matter of experienced vigilance than of any adjuvant. Measured by death rate, there appears to be nothing to choose between the results of those who use insulin and those who dispense with it.

Cardiovascular.—Weakness, frequency, and irregularity of the pulse have all been noted. A pulse rate over 90 and especially above 120 is regarded as a danger-signal. According to Oberholzer, cardiovascular complications are much commoner with somnifaine than with luminal ; and so much less severe with the latter that treatment never had to be broken off on this account, in comparison with the use of somnifaine. Collapse is specially likely in the early stages, up to the third day. Müller (1925) considers this to be the most dangerous complication. It is characterized by deep stupor, cyanosis, quick thready pulse, quickening of respiration, and often high fever of sudden onset. He quotes five cases from his own experience—all schizophrenics. Ström-Olsen considered that by the use of insulin and glucose the danger was certainly avoided, as he had no cases of collapse in 107 cases treated with this modification. Bradycardia (pulse under 50) has been recorded. A fall in the blood pressure under 90 is regarded as a danger-signal (Palmer) and so also is any cyanosis.

Respiratory.—Shallow or laboured breathing, with respirations exceeding 25 a minute, lobar pneumonia and bronchopneumonia, especially the latter, are the more serious complications. They are to be attributed to the direct effect of the hypnotic—depression of the respiratory centres, partial paralysis of the capillaries by the barbiturate, and the postural congestion from lying always in one position. Swallowing of the tongue is recorded in one case by Palmer and Braceland. Mucus in the throat is recorded frequently by Palmer and Braceland. Cheyne Stokes breathing has been observed (Serejski and Feldmann, 1937) and the same authors describe nose-bleeding. Hiccup has been recorded by Meerloo.

Urinary.—Oliguria, anuria, and albuminuria may all occur. The first two

may usually be avoided by sufficient fluid intake. They are favoured by fever, increased pulse rate, and vomiting, but even this symptom complex may be cleared up by pushing fluids, by giving diuretics, and, as Oberholzer suggests, by giving luminal instead of somnifaine. Retention is a fairly common complication, e.g. 12 out of 40 cases of Ström-Olsen's had had to be catheterized and 17 out of 100 cases in Monnier's series. This complication is more common in " toxic " cases. Cystitis may, of course, result.

Fever.—Fever up to 101° is not considered by some an indication for breaking off, in the absence of signs of infection. Fever is often associated with a failure of diuresis ; when the latter is re-established, the temperature falls. Hyperpyrexia has been recorded.

Skin Conditions.—Skin conditions are known to occur in cases of barbiturate medication (in 3 per cent. of persons, it has been estimated) and occasionally they appear in narcotized patients. Monnier mentions simple exanthems, toxic œdema, and bullous eruptions. He ascribes a partial lagophthalmos to hyperæmia of the conjunctiva.

Gastro-intestinal Tracts.—Retching or vomiting occurred in 53 out of 100 cases (Monnier). They occurred as often with the uncomplicated cases. Atropin is contraindicated as obscuring the clinical picture. Jaundice occasionally occurs (Meerloo). Urobilinogen may appear in the urine (Müller, 1927). Two cases of Monnier's had a perirectal abcess, attributable presumably to some clumsiness with the rectal tube. Furrer recorded pytalism and pains in the limbs without local signs.

Nervous System.—Epileptiform seizures have been reported, e.g. in four of Monnier's cases and in five out of 500 cases treated at Santpoort (Kooy, 1934). These occurred in the first or second day. Sudden withdrawal of the hypnotic may precipitate a convulsion. One of Monnier's schizoid psychopaths afterwards exhibited spastic paralysis of both legs. Radial paralysis has been recorded (Oberholzer) and can obviously be avoided by nursing precautions.

Loss of Weight.—Monnier's cases (i.e. with Cloetta's mixture) lost 4–5 kg. in weight during the treatment. He regarded this as of therapeutic value in that it is a sign that metabolic processes are altered.

Ketosis.—70 per cent. of patients develop ketosis (Ström-Olsen, 1933). When insulin and glucose are used, ketosis is absent.

Idiosyncrasy to Barbiturates.—Müller (1927) quoted the case of an 18-year-old girl who died after 4 c.c. somnifaine had been given. Meerloo (1933) quotes a case of a 27-year-old female who died after 90 drops of somnifaine had been given by mouth and 4 c.c. intramuscularly. Oberholzer (1927) records a patient who developed a high fever on the fifth day, with cardiac weakness, and who during a second course of treatment developed pneumonia. He concludes that this patient had an idiosyncrasy for barbiturates. Palmer and Braceland always gave a preliminary smaller dose of sodium amytal, to guard against the occasional patient with hypersensitiveness.

Contra-indications

Emaciation, tuberculosis, and liver, kidney, circulatory, and metabolic diseases are contra-indications (Maier). Also the time of menstruation has to be avoided. The patient recovering from an influenzal attack should not be treated until some time has elapsed ; and the presence of a mild epidemic of influenza postpones treatment (Meerloo). Tracheitis is a contra-indication (Oberholzer). Dozy (quoted by Kooy), however, treated patients with compensated heart lesions, with the aid of digalin throughout, and without mishap. Ström-Olsen does not exclude patients with valvular disease of the heart, provided that it is well compensated. Manic patients with toxæmic signs are dangerous to treat by this method.

Physiological Changes During Treatment

Monnier describes three types of course : (*a*) Consists of those cases with an uncomplicated course—" physiologische Dauerschlaf." Hours of sleep are about 22 out of the 24. The blood pressure is slightly lowered, the pulse of good tension, regular, somewhat increased in rate (86–90 per minute) and the breathing similarly increased (about 21 per minute). The temperature runs between 36·7° and 37·1° C. Reflex excitability is diminished. Micturition and defæcation occur usually spontaneously. The maximum dosage required is reached on the second day and thereafter diminished to the fifth day. After the fifth day the dosage has to be gradually increased again. (*b*) These are cases with a labile, slightly complicated course. This second group consists of those cases in which the pulse, temperature, and breathing reach a higher level than in group (*a*), and higher dosage is required to produce and maintain a satisfactory depth of sleep. The fluid intake is less. (*c*) Those with a very complicated course. Out of 125 courses of treatment, 25 had to be broken off. In this group larger doses of hypnotic were necessary, the hours of sleep were less, the temperature and pulse higher and more irregular, the breathing was considerably more rapid, and the fluid intake considerably less.

Meerloo describes a flattening of the temperature curve after the third day, except with very large doses which produce violent fluctuation. Temperature alterations persist after the treatment. In five cases out of 50, Meerloo observed fever develop after the 14th day of treatment.

Broder (quoted by Palmer and Braceland) found no significant change in the blood composition in *p*H, CO^2, or NPN content. Dameshek, Meyerson, and Loman (1934) record a fall in the B.M.R. up to 7 per cent. ; and a fall in the CO_2 and dextrose uptake by the brain. Lindemann (1934) recorded that the chronaxie returned to normal during narcosis, and believes that this demonstrates a parallelism between mental and physical responsiveness. The systolic and diastolic pressures both fall.

Deaths During Treatment

It has been remarked that deaths are more common in small series than in large : i.e. that the death rate varies inversely with the experience of the doctor.

Müller (1925) collected 315 cases from the literature with 15 deaths, but the latter occurred to a disproportionate extent in the small series. He says these deaths can be divided into three groups : (1) Five cases who during life showed acute heart failure and in whom at post-mortem no special organic findings were made. These cases must be considered as pure poisonings : they suffer from the kind of collapse condition already mentioned. It is not clear how the poisoning had this fatal outcome. Animal investigations by Redonnet (1919–21) do not shed any light on the question. In this group are one case of Moser (1923), one of Furrer, two of Wyler (1924), one of Gundert (1924–25). (2) Six cases with lung complications which showed pneumonia at post-mortem (Kläsi one, Furrer one, Demole one, Mollenhof (1924) one, Müller two). Kläsi and Furrer considered that the doses their patients had received were insufficient to cause death ; Müller thinks, however, the deaths were undoubtedly due to somnifaine poisoning and that the treatment can predispose certain patients to the onset of pneumonia. (3) Four cases in which pre-existing diseases have led to death during treatment (Kläsi two, Mollenhof one, Wyler one). Mollenhof's case had bronchitis which developed into pneumonia during treatment and Wyler's case was a pneumonia (otherwise undiagnosed). Müller considers that all these 15 deaths are attributable to the somnifaine.

Oberholzer says that all the fatal cases reckoned up to that time (1929) had been asthenic or very thin in physique, except where physical ailments already existed. Kläsi's three deaths were respectively with parenchymatous nephritis, sinus thrombosis, and pneumonia. One of Dozy's cases had generalized œdema with albuminuria, another had meningitis, and two developed pneumonia in the course of an influenza epidemic. Other fatal cases were elderly—59 (Kläsi), 66, 59, and 54 (Wyler). Two of Dozy's cases were respectively 53 and 46. Oberholzer remarks that when young, healthy patients died they have been very acutely agitated cases.

Post-mortem findings in fatal cases from simple overdosage have been rarely recorded, e.g. by Honi and Hasselt (quoted by Kooy, 1934), who recorded the case of a female dying of cardiac and respiratory failure after large doses of somnifaine (four injections per day for three days and one on the fourth day). There was degeneration of ganglion cells in the nucleus dentatus, hypothalamus, striate and medulla oblongata.

Sequelæ of Treatment

(Monnier.) Improvement sets in gradually. Some patients weep a little and are at first restless. Those with a manic depressive constitution show some euphoria. Many chronic schizophrenics show a childlike dependence on those around them. In many schizophrenics dream-like experiences and hallucinations appear, the hallucinations being not only auditory but optic and haptic. The skin paræsthesia are attributed by Monnier partly to the fact that Cloettal is excreted through the skin and mucous membranes. Memory for the events of the treatment is slight and confused (Ström-Olsen, 1933). Ostlind (1936–7) declared that in the majority of his cases there was no amnesia for the treatment.

When relapse occurs it is possible to see the psychotic ideas once again

invading the patient's mind, with ever-increasing strength. The patient begins by realizing this to some extent. Some patients show an initial improvement, followed by partial relapse, and then by final cure after about 10 days.

In one of their cases Serejski and Feldmann describe in the first two days of awakening a series of neurological signs, resembling an encephalitis or mild meningeal syndrome (facial immobility, posture rigidity, localized cramps). Four days after awakening, vegetative disturbances are prominent—slight rise in temperature, genito-intestinal disturbances, sweating, frequent micturition. They remark other symptoms : bodily weakness, tremor of the hands, sweating, fainting, and mental fatiguability ; and on the other hand, deliria with hallucinations and illusions.

Results

Meerloo says that results can never be foretold. Surprise is certainly possible with an individual case. For example, Maier (1934) expressed his astonishment at the lasting improvement shown by a chronic exceptionally excited catatonic woman. Men are less suitable subjects than women. They require higher doses to produce and maintain sleep. Monnier decided to abandon the method with male schizophrenic patients, following a series of five male cases with severe lung complications (lung œdema or bronchopneumonia) and one who could not be got to sleep with the aid of Cloettal. On the other hand, of 79 women who underwent in all 120 courses of treatment only 21 had a complicated course and only one died. These figures refer to schizophrenic cases (schizophrenic in the Zurich sense). Müller (1927) records that schizophrenics of pyknic body type give better results than those with asthenic physique. Palmer (1937) makes the same comment for his cases as a whole.

Results are best discussed under the heading of the syndromes or reaction types. At the same time, it is necessary to remember that diagnostic criteria may vary considerably from one clinic to another and even in the same clinic at different times. Thus at the Burgholzli, where so much of this treatment has been done, the admission ratio of manic depressive psychoses is in the ratio of 1·5 per cent. of the total admissions ; whereas in British and American mental hospitals those diagnosed as manic depressives amount to 15 per cent. of the total. This makes the results of different hospitals very difficult to compare, and makes the assessment of the results in general difficult also.

Affective Psychoses.—In trying to assess the results obtained in the psychoses generally, it is best to keep apart the figures of British and American authors on the one hand and of Continental authors on the other. This reduces the statistical difficulties arising from differing criteria of classification. Nevertheless this device hardly eliminates the recurring difficulty of classification differences. Thus of his series of 92 cases, of whom 21 were classed as either manic or depressive, Oberholzer remarks : " The greater part of the 92 patients who submitted to one or more ' sleep cures ' were schizophrenics. In the group of manic cases there may be a few who would in other places have been designated

as suffering from manic depressive insanity. Yet all these cases showed clearly schizoid traits, they were ' mixed ' manics, paranoid traits were frequent in them, the trend of thought showed a schizophrenic *sprunghaftigkeit* (leaping from one topic to another) near to a flight of ideas ; and the affective rapport is poor for a manic." Of the 24 cases he refers to, 15 were described as manic and six as depressive. Seven of the manic cases improved enough to be discharged ; but none of the depressions showed more than a temporary improvement. In " chronic manics " (19 cases) the method was a failure.

Ström-Olsen and MacCowan published the following results of 45 cases, which belonged in their opinion to the group of affective psychoses :

	RECOVERED	IMPROVED	NO CHANGE	TOTAL
Manic	11	4	3	18
Chronic manic	0	2	0	2
Melancholic	3	5	9	17
Benign stupor	1	1	1	3
Involutional melancholia	2	1	2	5
	17	13	15	45

They append the significant remark : " All cases except four sooner or later made a complete recovery." The chief advantage therefore appears to be that attacks are curtailed, especially manic attacks.

McNiven (1936) treated 25 cases that he regarded as belonging to the affective reaction-type. Four successes were reported : one case of mania of 6 months' duration : one of depression of 6 months' duration ; one of depression and paranoid tendencies of 2 years' duration ; and one case of depression of 8 months' duration. This is not an impressive proportion, but at least three of the cases could be regarded as having been curtailed. In addition nine permanent improvements were recorded in five cases of mania and four of melancholia. Palmer (1937) classed 27 patients among the affective reaction types. He says that both cases of acute mania showed permanent improvement or recovery. Of three cases of recurrent mania one showed permanent improvement, one made a complete remission and relapsed, while another was unchanged. The results were relatively more impressive with 15 cases of simple depression, of whom five cases recovered and four made a " permanent improvement." Of seven agitated depressions in middle age, two recovered. These results have to be collated with those of subsequent recovery, especially when it is noted that the percentage of cases in which success was obtained (33 per cent.) certainly does not exceed, in fact, does not equal the spontaneous recovery rate.

Palmer and Paine recorded five recoveries out of nine manic depressive psychoses (five manic and one depression) and two considerably improved. Adding the results obtained in manic depressive conditions by ten authors—Palmer and Paine, Parfitt, McNiven, Ström-Olsen, and McCowan, Palmer, Palmer and Braceland, Hennelly (1934), Kearney and Courtney (1938), Day (1936–7), and Wilson and Gillman (1938) the following table is obtained :

	CASES	RECOVERED	IMPROVEMENT (LASTING)
Palmer and Paine ..	9	5	2
Parfitt	20	5	8
McNiven	25	4 (3 dep.)	9
Ström-Olsen and McCowan	45	17 (mainly manic)	13 (presumably lasting).
Hennelly	43	15	—
Palmer	25	8 (mainly dep.)	5
Kearney and Courtney ..	38	11	8
Day	59	24	30
Palmer and Braceland ..	46	23 (19 manic)	5
Wilson and Gillman ..	45	21	10
	455	133	90

These results (just over one-third of recoveries) were obtained preponderatingly with manic excitements. The two series (McNiven and Palmer) in which recoveries in depressions predominated were too small to have any statistical significance.

It will be observed at once that the percentage recovery rate produced by the method falls short of the recovery rate of the same conditions when allowed to run their natural course in hospital. The observation of Ström-Olsen and McCowan (*vide supra*) is relevant here that cases that failed to respond to treatment by continued narcosis recovered subsequently. It appears in fact that in affective psychoses what prolonged narcosis does in all probability is to hasten recovery in those cases which would have ultimately recovered spontaneously if treated by the more conservative method. Whether the method does more than this could only be settled by following the fate over a number of years of a large series of cases treated with prolonged narcosis, which failed to respond, and thus to ascertain what the final recovery rate of the whole series was, in contrast with the recovery rate of a similarly large number of cases not treated by this method. But it seems improbable that there would be any discernible difference, at least in the case of the manic excitements. With depressions there is wider scope for improvement in the spontaneous recovery rate, but the much poorer results obtained by prolonged narcosis from depressive rather than from manic cases makes a significant difference on the ultimate recovery rates very improbable here also. On the other hand, one series at least has shown a higher percentage of immediate recoveries than this : although again less than the ultimate spontaneous recovery rate. Kooy records 43 immediate recoveries out of 80 cases (44 manics with 29 recoveries, and 29 melancholics with 14 recoveries), but no particulars are published.

In addition to the advantage of cutting short an attack of manic excitement it has been argued, e.g. by Bond (quoted by Palmer and Braceland, 1937) that prolonged narcosis prevents the " permanent damage to the psychic mechanism " of the patient which he believes the experience of an acute manic attack inflicts if it goes on in full force and untrammelled. This is purely a speculative advantage as far as permanent damage is concerned, since permanent deterioration after a single manic attack must be almost unknown. A better justification, is the saving of time, of hospital accommodation, and of strain on the nursing staff resulting from curtailment of the attack.

In involutional psychoses, although only a small minority of cases are cut short completely, the treatment is useful in others in relieving agitation and tension.

Schizophrenic Psychoses.—The data from the four principal papers by the workers at Zurich, beginning with Kläsi's paper in 1922, when put together show the following results :

	CASES	DISCHARGED	IMPROVED (LASTING)
Kläsi	22	8	—
Oberholzer	69	5	10
Lutz	83	9	32
Monnier	84	40	13
	258	62	55

I have excluded those cases of Oberholzer's which he labelled manic or depressive, although he himself seemed to think that few of them were exempt from schizophrenic traits. But such methods tend to class everything as schizophrenia.

It will be seen that the social recovery rate is approximately 25 per cent. These are all comparatively recent cases, so far as can be ascertained from the records. This is in close agreement with Palmer and Braceland's figures—22 per cent. remissions in 46 cases—who probably were less apt to place a patient in that class. The percentage of recoveries is less than the figures accepted as representing the standard spontaneous recovery rates for schizophrenic patients in Swiss mental hospitals, which has recently been stated, generously perhaps, at 30 per cent.

It is important to observe that this figure of nearly 25 per cent. recovery rate is disproportionately influenced by the inclusion of Monnier's series of 84 cases, which had a nearly 50 per cent. recovery rate. His best group represented what he called psychogenic reactions in schizoid psychopaths—i.e. not in what he considered to be schizophrenic psychoses of the more usual kind. The Swiss authors in general find it necessary to make a distinction between the " organic " or " process " schizophrenics and those schizophrenic reactions which are dependent mainly on psychological factors. This distinction is not usually made by British or American authors. In " process " schizophrenia Oberholzer considered that results were specially likely to be obtained when the acute " organic " or " toxic " process had subsided and when the symptoms were consequently in his view only residual symptoms. Maier (1934) holds a similar view.

That criticism of these figures is justified is suggested by Müller's very considerable collection of cases from the literature (1925). Of these 24 showed much improvement, 70 were improved, 159 remained in *status quo*, and 15 died. This gives a percentage of 8·9 much improved, 26 per cent improved, and 59 per cent unimproved. These figures are in close accord with Lutz and Oberholzer's data for schizophrenic patients who " recovered," i.e. became well enough to be discharged from hospital. (In the above data generally I have treated as " recovered " those who were well enough to be discharged, i.e. who made at least social recoveries.)

Eight or nine per cent. thus appears to be the figure obtained for social recoveries immediately following the treatment when schizophrenics, apart from psychogenic disturbances in schizoid psychopaths, are excluded. This is not a very impressive figure ; and again the same criticism is suggested as for affective psychoses—that the treatment accelerates recovery in a proportion of cases (much smaller than in manic excitements), and that it is doubtful whether it influences the ultimate recovery rate. This was long ago suggested by Moser (1920). This is supported by inspection of Ostlind's (1937) data, which show that of 19 cases of less than 5 years' duration, none were discharged immediately, three were discharged after 3 months, and a further five after 6 months—i.e. the treatment was given, without success to eight patients (out of 19) who recovered in the course of time.

Chronic Schizophrenics.—The benefits of prolonged narcosis are, however, possibly not confined to cutting short some schizophrenic episodes which otherwise would in time probably have subsided. Some chronic cases can be influenced to the extent of social recovery. Serejski and Feldmann (1937) chose, unlike most other authors, to make chronic schizophrenic patients (cases which had been in the hospital for 2 years) their special study, obtained five complete recoveries out of 28 cases and 17 recovered sufficiently to be discharged. These remarkable results contradict to some extent the suggestion that continued narcosis only hastens recovery in otherwise recoverable cases ; but such results are so at variance with the general experience as to require further explanation. Most of the case records are omitted. For example, out of 45 cases of more than 2 years' duration collected by Müller from the literature, only five were recorded as " much improved." Other chronic cases are improved to an extent which enables them to live in the quiet instead of the disturbed wards. In other cases individual symptoms can be influenced or abolished, e.g. a hallucinosis or stereotyping of thought or action.

As regards the various syndromes chronic agitated depressed patients give fair results. Katatonic and hebephrenic cases of acute onset are regarded by Maier as the most favourable. Kläsi found favourable results in katatonic " encapsulated " cases, that is cases with vegetative and artistic characteristics, and cases with much anxiety and agitation. Katatonic stupor does not give favourable results (Monnier). Acute katatonic states of excitement (of severe degree) present special dangers owing to the risk of overdosage from the large quantities of narcotic necessary. Oberholzer made the generalization that all cases tending to periodicity, to remission or relapse offer the possibility of a good result, provided the stage of " organic " dementia has not been reached. Maier (1934) opined that cases in which pronounced manic and depressive components appear are specially favourable, provided no chronic catatonic symptoms occupy the foreground. Müller's conclusion was similar in that excited and depressed forms of schizophrenia were particularly successful. Oberholzer similarly felt that the treatment was most effective with manic states, whether they were manic depressive or schizophrenic.

Paraphrenia.—Occasional unexpected successes are recorded, e.g. by Parfitt (1936) in two women of 44 and 47 respectively, in one case after three years.

Psychoneuroses.—The claims of Ström-Olsen that of 13 " psychoneuroses " treated eight recovered is unfortunately barely borne out on inspection of the case records given in his paper. A considerable proportion of his small series seem to have been examples of psychotic states.

Organic Brain Disease.—Demole records that even the negativism accompanying organic brain disease may be relieved. He instances a case in which the patient, a general paralytic, became considerably more co-operative after a course of continuous narcosis.

Conclusions

1. Continuous narcosis if thoroughly carried out, is still fraught with some danger, in spite of modifications in treatment. The degree of freedom from risk is proportionate to the experience and care of those undertaking the treatment, rather than dependent on any particular modification of technique.

2. The recovery rate in continuous narcosis in recent psychoses never exceeds and usually falls short of the ultimate spontaneous recovery rate. Its therapeutic value is therefore confined mainly to curtailing the duration of psychotic conditions which would sooner or later recover spontaneously. It is most successful in this way with manic excitements, and considerably less successful with depressions of the manic depressive type. With recent schizophrenic disorders, its effects in curtailing the duration of the illness are seen mainly in excited schizophrenics of the agitated fearful type and in hebephrenics, in each case where the onset has been acute. Psychogenic schizophrenic disturbances in schizoid psychopaths are particularly amenable to this method. Little success is obtained with paranoid schizophrenics and with catatonic stupor. In general, the more a psychotic illness follows a relapsing, recurring, or periodic course, and the more acute the onset, and the more exogenous the causation, the more likely is continuous narcosis to curtail the episode. These are essentially the more spontaneously recoverable types. Apart from curtailment of a psychotic illness of the more recent kind, continuous narcosis has an administrative value in that it fairly frequently has the effect of making chronic psychotic excitements more manageable. Occasional unexpected social recoveries are produced in chronic depressive (affective) psychoses and in chronic schizophrenics ; while recently two observers have in a small series of cases recorded an unprecedentedly high recovery and discharge rate in a group of schizophrenics of over two years' duration.

3. The treatment is still entirely empirical, and its efficacy is very difficult to estimate in any precise fashion on account of the varying diagnostic criteria employed by different workers in different clinics.

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NOTICE

THIRD INTERNATIONAL NEUROLOGICAL CONGRESS

THIS will be held in Copenhagen from 21st to 25th August, 1939, under the Presidency of Professor Viggo Christiansen.

Monday, 21*st August.*

9.30 a.m. Official opening of the Congress at the Rigstag Building.

10 a.m. Discussion : The Endocrine-Vegetative System with Special Reference to Neurology.

Chairmen : Professors L. van Bogaert and Pette.

Rapporteurs :

Sir Henry Dale (London) : Chemical mediation in the peripheral nervous system and its relation to endocrine organs.

Dr. Laruelle (Brussels) : Les bases anatomiques du système autonome bulbo-spinal et cortical.

Professor Fulton (New Haven) : Physiologie du système autonome cortical et bulbo-spinal dans sa connexion avec l'appareil endocrinien.

Professor Foerster (Breslau) : Die Beziehungen von Hypophyse und andere endokrinen Drüsen zum neuro-vegetativen System.

Dr. Forsberg (Oslo) : Die Beziehungen der endokrinen Drüsen zu den Muskelfunktionen unter besonderer Berücksichtigung der Myopathien.

Tuesday, 22*nd August.*

9.30 a.m. Discussion : The Heredo-Familial Diseases, especially from the Genetic Aspect.

Chairmen : Professors G. Guillain and V. M. Buscaino.

Rapporteurs :

Professor Sachs (New York) : L'idiotie familiale amaurotique et ses relations avec les autres maladies héréditaires et familiales.

Professor Thomas (Paris) : Les maladies héréditaires et familiales du système cérébelleux. L'hérédo-dégénération spino-cérébelleuse.

Professor Jonesco-Sisesti (Bucarest) : Les affections extra-pyramidales. La dégénération hépato-lenticulaire. La chorée de Huntington. Les myopathies. Les atrophies nucleaires. La neurofibromatoses.

Professor Curtius (Berlin) : Les maladies héréditaires du système nerveux au point de vue de la génétique.

Professor Schaffer (Budapest) : L'anatomie pathologique générale des maladies héréditaires et familiales du système nerveux.

Thursday, 24th August.

9.30 a.m. Short papers on various neurological and neurosurgical subjects.

Friday, 25th August.

9.30 a.m. Discussion : Neurological Aspects of the Avitaminoses with Special Reference to the Peripheral Nervous System.

Chairman : Professor G. H. Monrad-Krohn.

Rapporteurs :

Sir Edward Mellanby (London).
Professor G. C. Riquier (Pavia).
Dr. J. S. Wechsler (New York).
Dr. D. McAlpine (London).
Dr. H. P. Stubbe Teglbjaerg (Copenhagen).

Regulations

Active Membership.—Applications for active membership from neurologists in Great Britain should be made to the Secretary of the British National Committee, Dr. Macdonald Critchley, 137, Harley Street, London, W.1, to whom the subscription, 40 Danish Kroner, should be paid.

Associate Membership is open to non-professional persons, men and women, interested in the Congress. The subscription is 20 Danish Kroner.

Scientific Contributions.—Papers, bearing on one of the three main subjects or on any aspect of neurological medicine or surgery, are invited. The maximum time allotted is ten minutes. Titles, together with an abstract not more than one hundred and fifty words long, should be sent to the Secretary of the British National Committee by 1st April, 1939. If members wish to have their papers published in the Transactions of the Congress the typescript (not longer than 1,500 words) must be handed in at the Bureau before the end of the Congress. Authors must pay for their own illustrations (10 to 17 Danish Kroner for the page).

Official Travel Agents.—Arrangements for travel and hotel accommodation are in the hands of the American Express Company, 6, Haymarket, London, S.W.1 (Whitehall 4411).

Local Secretary.—Dr. Macdonald Critchley, 137, Harley Street, London, W.1.

EPITOME OF CURRENT JOURNALS

ACTA PSYCHIATRICA ET NEUROLOGICA

Vol. 13. No. 2. 1938.

Bror Gadelius. V. Wigert. 125.

*The Innervation of the Intracranial Blood-Vessels. E. Busch. 131.

Insulinschockbehandlung bei chronischen schizophrenen Psychosen. (Insulin shock therapy in chronic schizophrenic psychoses.) H. Fröshang and H. Thomstad. 139.

Über Trigeminusneuralgie und ihre Ursachen, insbesondere ihre Beziehung zu Zahn- und Kiefererleiden. (Trigeminal neuralgia and its causes, especially in relation to diseases of the teeth and jaw.) M. Melchior. 163.

Nerves to Cerebral Vessels.—By means of staining with methylene blue, it has been possible to demonstrate a rich network of non-medullated nerves in the cerebral vessels down to arteries of a diameter below 0·1 mm. Medullated nerves were only found on the largest arteries. Excellent illustrations. (E. A. C.)

ALLGEMEINE ZEITSCHRIFT FÜR PSYCHIATRIE UND IHRE GRENZGEBIETE

Vol. 108. Nos. 3 and 4. September 1938.

Erbliche Fallsucht, Erfahrungen bei Erbgesundheitsbegutachtungen. (Hereditary epilepsy. Experiences from reports on sterilization.) F. Laubenthal. 197.

Der Erbkreis der Epilepsie. (Hereditary aspect of epilepsy.) K. Conrad. 226.

Über schizophrene Halluzinosen. (Schizophrenic hallucinations.) J. Wyrsch. 231.

Das Elektrenkephalogramm des Menschen. (The electro-encephalogram in man.) H. Berger. 254.

*Anatomisch-pathologische Bemerkungen zur Frage der Schizophrenie. (Anatomo-pathological observations on the question of schizophrenia.) G. Peters. 274.

" Die Heilung der Geisteskrankheiten mit natürlichen Heilstoffen " nach Honekamp. Eine Nachprüfung im Auftrage des Reichsärzteführers. (" Cure of mental diseases by natural products," according to Honekamp.) W. Stemmler, Langelüddecke, and Schiese. 279.

*Die Frage der Dosierung bei der Insulinbehandlung der Schizophrenie. (The question of dosage in the insulin treatment of schizophrenia.) H. Müller. 296.

Beobachtungen über die Einwirkung der Cardiazolkrampfbehandlung auf das klinische Bild von Psychosen. (Observations on the influence of cardiazol shock treatment in the clinical picture of psychoses.) E. A. Schmorl. 328.

Noch einmal Caligula und Domitian. (Caligula and Domitianus: a further contribution.) E. Müller. 343.

Zur Durchführung der Diagnostatistik. (Statistics of diagnoses.) H. Göllner. 347.

Veränderungen der Leberfunktionen als Voraussetzung von Störungen des Zentralnervensystems. (Liver disturbances as a cause of disturbances of the c.n.s.) F. Fischler. 350.

Morbid Anatomy of Schizophrenia.—There is no evidence for the view that schizophrenia is primarily a disease of the brain. All the changes hitherto described as pathognomonic can be found in brains of mentally normal persons. (K. S.)

Dosage of Insulin in Treatment of Schizophrenia.—The individual is sensitized to insulin after the first coma, after epileptic attacks, and after the date of ovulation. During menstruation, on the other hand, higher doses are tolerated. (K. S.)

AMERICAN JOURNAL OF PSYCHIATRY

Vol. 95. No. 2. September 1938.

The Likeness of the Cortical Dysrhythmias of Schizophrenia and Psychomotor Epilepsy. F. A. Gibbs, E. L. Gibbs, and W. G. Lennox. 255.

*Treatment of Schizophrenia with Insulin Shock. A. H. Vander Veer and H. H. Reese. 271.

Insulin Treatment of Psychoses. E. Ziskind and E. Somerfeld-Ziskind. 291.

*Metrazol Treatment in Schizophrenia. N. W. Winkelman. 303.

A Chart for Control and Recording of Insulin Shock Therapy. D. Goldman. 317.

Multiple Therapy in the Psychoses. H. H. Goldstein, E. F. Dombrowski, and J. V. Edlin. 321.

*The Early Effects of Metrazol Therapy in Chronic Psychotic Over-Activity. L. H. Cohen. 327.

*The Histopathology of the Psychoses with Subacute Bacterial and Chronic Verrucose Rheumatic Endocarditis. W. I. Brütsch. 335.

The Present Status of Fever Therapy in the Prevention and Treatment of Neurosyphilis. A. J. Rosanoff. 347.

*The Effect of Adrenalin and Mecholyl in States of Anxiety in Psychoneurotic Patients. E. Lindemann and J. E. Finesinger. 353.

The Effective Use of Phenobarbital and Benzedrine Sulfate (Amphetamine Sulfate) in the Treatment of Epilepsy. B. Cohen and A. Myerson. 371.

Observations on Confabulation. H. W. Williams and C. Rupp. 395.

Ulcerative Colitis and the Personality. W. T. Brown, P. W. Preu, and A. J. Sullivan. 407.

Treatment of Schizophrenia with Insulin Shock.—The results of insulin shock therapy in a series of schizophrenic patients are described together with the chief complications encountered in their treatment. In 18 cases with duration of psychosis of under 1 year there were nine full remissions, two social remissions, two improvements and five unimproved. In 16 cases with a duration of over 1 year there was one full remission, two social remissions, 3 improvements, and 10 unimproved. The authors consider that remissions of good quality can be obtained in 70 per cent. in acute schizophrenia if insulin shock therapy is instituted within 1 year of onset, and that this figure is double that of spontaneous remission.

Metrazol Treatment in Schizophrenia.—Detailed analysis of the 35 cases of schizophrenia treated shows that the factors determining the prognosis are : duration of the disease ; age of patient ; age at onset ; type of disease, whether catatonic, paranoid, or hebephrenic ; personality prior to onset ; but the most important single aspect is the presence or absence of deterioration. The authors obtain better results with catatonic than with the paranoid type of disease.

Early Effects of Metrazol Therapy in Chronic Over-activity.—Metrazol treatment was carried out in a group of 42 patients (16 men and 26 women) characterized by chronic excitement over a period of 6 months to 22 years. Treatment was administered daily and terminated when further improvement seemed improbable. The authors found generally, as early effects, that there was marked general improvement after treatment ; there was a diminution of over-activity, over-talkativeness, aggressiveness, destructiveness, and incontinence. The necessity for sedation ceased ; and about half the patients became capable of productive work.

Histopathology of the Psychoses with Rheumatic Endocarditis.—From an ætiological point of view two types of psychosis with endocarditis can be distinguished : (1) psychosis with sub-acute bacterial endocarditis, dying soon after the onset of mental symptoms ; (2) psychoses with chronic rheumatic endocarditis. The first group of cases is characterized by acute delirious mental symptoms and post-mortem histological examination shows numerous miliary abscesses and numerous cocci in the capillaries of the cerebral cortex. The second group of cases may present any reaction type. Some such cases are diagnosed as dementia præcox, others as manic depressives or involutional psychoses. A case has even been classified as senile psychosis. The cerebral lesions consist either of small or large areas of infarction with a normal macroscopic appearance ; microscopic examination may show numerous cellular areas, occasional granulomata, and small connective tissue scars.

Adrenalin and Mecholyl in Anxiety States.—The effects of intramuscular injections of adrenalin and mecholyl were investigated in a series of 20 psychoneurotic patients. The patients received an intramuscular injection of 1 c.c. of adrenalin chloride or of 5–25 mgs. of acetyl beta-methyl choline. It was found that anxiety attacks typical for the patient were reactivated by adrenalin in six patients and by mecholyl in five cases.

ANNALES MEDICO-PSYCHOLOGIQUES

Vol. 96. Part 2. No. 2. July 1938.

*Sur l'Alexie d'Evolution Familiale et Héréditaire. (Familial alexia.) A. Ley. 145.
Études Cliniques et Considérations Nosographiques sur la " Démence Précoce." (1). (Clinical studies and nosographic considerations of dementia præcox.) H. Ey and Mme. Bonnafous-Serieux. 151.
*Sur la Schizophrénie Tardive. (Late schizophrenia.) D. Kouretas and M. G. Stringaris. 182.
*Essais de Traitement de quelques États de Démence Précoce par la Tuberculine. (Attempts to treat certain cases of dementia præcox with tuberculin.) Toye and Ruff. 194.

Familial Alexia.—The author's observations were on a family of which the father and three out of four children showed an identical type of alexia. The father had been to school, but had never learned to read. He was otherwise of normal intelligence. He successfully carried on trade and could calculate sufficiently to adjust his accounts. The eldest daughter, aged 25, could read and had had a normal school career. The second daughter, aged 19, left school unable to read, but showed normal intelligence and arithmetic talent. She could copy elementary pictures, but made mistakes in copying script, and experienced considerable difficulty in learning to read up to the age of 17, when quite suddenly within the course of a few weeks facility in reading developed. A third child died in infancy. The fourth, a boy of 13, presented the same symptoms as his alexic sister, with normal intelligence and mathematical faculty. The fifth child, aged 9, also experienced the same difficulty, and had normal intelligence.

Late Schizophrenia.—A study of a man aged 64 exhibiting paranoiac symptoms accompanied by a hallucinatory persecution mania. The psychotic symptoms developed at the age of 51 in a personality that had probably always been hypoparanoiac. A discussion of this case leads the

authors to the conclusion that presenile psychoses do not necessarily differ in their pathogenesis from psychoses arising in early life, and that many cases resembling the one under consideration are to be regarded as late manifestations of schizophrenia.

Treatment of Dementia Præcox with Tuberculin.—Twenty-six cases of dementia præcox were chosen for this treatment. The duration of the psychoses varied from a few months to 22 years. All the cases were in good bodily state and free from all signs of previous tuberculous infection. The tuberculous therapy was preceded by cutaneous allergic tests. In all the cases except three the reaction was strongly positive. The treatment was carried out for three months and crude tuberculin of the Pasteur Institute was used. In 18 cases the administration was oral. The eight others received intramuscular injections of tuberculin. Local and general reactions were insignificant in the injected cases. The results were entirely negative.

Vol. 96. Part 2. No. 3. October 1938

Les Tendances du Développement de la Psychiatrie Allemande. (Developmental trends of German psychiatry.) R. Gaupp. 321.

Études Cliniques et Considérations Nosographiques sur la " Démence Précoce." (2). (Clinical studies and nosographic considerations of dementia præcox.) H. Ey and Mme. Bonnafous-Sérieux.

La Réforme de la Loi de 1838 Vue par un Médicin-Directeur de Maison de Santé Privée. (The law reform of 1838 as seen by a medical director of Maison de Santé Privée.) J. Vignaud. 395.

ARCHIVES DE NEUROLOGIE, BUCAREST

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Les Influences des Mesures ayant un Caractère Général sur l'Eugénétique. (The influence of factors having a general bearing on eugenics.) S. Manuila. 219.

Recherches sur la Présence de la Thyrosine dans l'Urine de l'Homme à l'État Normal et après in Effort Physique. (Investigations on the presence of thyrosine in the urine of man in a normal state and after physical effort.) C. Michailesco, L. Alexin, M. Zapan, and I. Luchianovici. 224.

Névralgie Brachiale Causée par une Métastase Locale Ostéoclasique du Tiers Moyen de l'Humérus Droit. (Brachial neuralgia caused by a local osteo-metastasis of the middle third of the right humerus.) E. Herskovits. 227.

Le Rôle du Système Nerveux dans les Modification Pathologiques de la Circulation Vasculaire du Poumon. (The role of the nervous system in the pathology of the vascular circulation of the lung.) E. Sargent, M. Forestier, and J. Brincourt. 235.

La " Démence Précoce " ou la " Schizophrénie " constituent-elles une Maladie ? (Are dementia præcox and schizophrenia one disease ?) H. Baruk. 256.

L'Importance du Système Neuro-Végétatif dans la Myasthènie Bulbaire. (The importance of the vegetative nervous system in bulbar paralysis.) A. Salmon. 266.

Les Formes Psychiques Pures ou Prévalantes de l'Hyperthyroidie. (The mental forms of hyperthyroidism.) P. Cossa. 280.

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*Periarteritis Nodosa : A Clinicopathologic Study with Special Reference to the Nervous System. J. W. Kernohan and H. W. Woltman. 655.

*The Nucleus Lateralis Medullæ : An Experimental Study of Its Anatomic Connections in Macacus Rhesus. G. A. Blakeslee, I. S. Freiman, and S. E. Barrera. 687.

Experiences with Insulin Shock Therapy in Schizophrenia. H. H. Reese and A. V. Veer. 702.

*Metrazol Shock Treatment of the " Functional " Psychoses. A. A. Low, I. R. Sonenthal, M. F. Blaurock, M. Kaplan, and I. Sherman. 717.

*Mechanism of Migraine Headache and Action of Ergotamine Tartrate. J. R. Graham and H. G. Wolff. 737.

Restlessness in Children. P. M. Levin. 764.

Bad Taste (Cacogeusia). H. H. Hart. 771.

*Human Autonomic Pharmacology. XI. Effect of Benzedrine Sulphate on the Argyll Robertson Pupil. A. Myerson and W. Thau. 780.

Autonomic and Motor Localization in the Hypothalamus. L. Ectors, N. L. Brookens and R. W. Gerard. 789.

*Experimental " Encephalitis " produced by Intravenous Injection of Various Coagulants. P. F. A. Hoefer, T. J. Putnam, and M. G. Gray. 799.

Periarteritis nodosa.—The clinical histories in five cases of periarteritis nodosa are presented. In three the peripheral nervous system was widely degenerated ; in one the brain and in one the choroid of the eye was involved. Degeneration of the peripheral nerves appears to be the result of occlusion or marked narrowing of the lumens of the nutrient arteries to the nerves. The degeneration begins as infarcation at higher levels, the infarcts being single, multiple, or confluent. Inflammation of the nerves does not occur. (R. M. S.)

Nucleus Lateralis Medullæ.—In macacus rhesus the nucleus lateralis constitutes, with the arcuata nucleus and the nucleus of Clarke and Monakow, a relay system between ascending proprioceptive pathways of the cord and the cerebellum. (R. M. S.)

Metrazol Shock Treatment of Functional Psychoses.—Metrazol shock treatment in this series of patients with " functional " psychoses gave a relatively high rate of recovery for persons with manic-depressive conditions and those " without psychosis." For the schizophrenic group, treatment yielded a relatively high rate of recovery only if given within 6 months after onset of the

disease. However, in the absence of knowledge concerning rates for spontaneous remission it is at present impossible to gauge accurately the therapeutic value of the convulsive treatment. For manic-depressive conditions the superiority of the metrazol treatment to that with prolonged narcosis appears evident ; it has increased the rate of remission and reduced the incidence of dangers and complications.

The claim advanced by some authors that the outlook for recovery is proportional to the " convulsive threshold " of the patient is not substantiated by the present investigation. Contrary to the assertion of some investigators, the metrazol paroxysm differs in several respects from the " grand mal " attacks of cryptogenic epilepsy. (R. M. S.)

Migraine Headache and Ergotamine Tartrate.—The authors conclude that the head pain of the migraine attack is produced by the distension of cranial arteries and that the termination of the headache by ergotamine tartrate is due to the capacity of this agent to constrict these cranial arteries and thus reduce the amplitude of their pulsations. (R. M. S.)

Human Autonomic Pharmacology.—In the Argyll Robertson pupil the light reflex may be restored in a partial way by installation of a dilute solution of benzedrine sulphate, ranging from 0·125 to 0·5 per cent., or by repeated subcutaneous injection or oral ingestion of the drug. Under such circumstances the pupil dilates, and while ordinarily only slightly mobile to flash-light, it widens in darkness and constricts in daylight, the movements of dilation and constriction being slow and deliberate but certain. (R. M. S.)

Experimental " Encephalitis."—The present study was undertaken to observe what changes, if any, in the central nervous system result from hypercoagulability of the blood produced experimentally. In experiments continued for some time, the resulting cerebral lesions closely resembled those of certain human " encephalomyelitides "—for example, those of the post-vaccinal and post-measles types. (R. M. S.)

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*Electro-Encephalography. IV. Localization of Seizure Waves in Epilepsy. H. H. Jasper and W. A. Hawke. 885.
*Differential Features of " Cerebellar " and " Vestibular " Phenomena in Macacus Rhesus : Preliminary Report Based on Experiments on Three Hundred Monkeys. A. Ferraro and S. E. Barrera. 902.
*Sensory Discrimination in Monkey, Chimpanzee, and Man after Lesions of the Parietal Lobe. T. C. Ruch, J. F. Fulton, and W. J. German. 919.
*Dystonia Musculorum Deformans : a Clinico-pathologic Study. C. Davison and S. P. Goodhart. 939.
Acid-Base Balance of the Blood in a Patient with Hysterical Hyperventilation. J. H. Talbott, S. Cobb, F. S. Coombs, M. E. Cohen, and W. V. Consolazio. 973.
The Ayala Index. N. Savitsky and M. M. Kessler. 988.
A New Series of Anticonvulsant Drugs tested by Experiments on Animals. H. H. Merritt, T. J. Putnam, and D. M. Schwab. 1,003.
*Astereognosis Associated with Tumors in the Region of the Foramen Magnum. J. E. Rubinstein. 1,016.
*Pathogenesis of Encephalitis occurring with Vaccination, Variola, and Measles. K. H. Finley. 1,047.
Role of Vitamin C in Metabolism of Nerve Tissue. H. Wortis, S. B. Wortis, and F. I. Marsh. 1,055.

Electro-Encephalography.—One hundred and seventeen electro-encephalographic examinations of 55 epileptic patients yielded wide variations in form, with some indications that specific forms may be symptomatic of the neuropathological condition forming the bases of the seizures, the wave forms from over traumatic scars being specific perhaps to this condition and the seizure waves from grossly damaged cortical tissue also being different from those arising on a different pathological basis. (R. M. S.)

Differential Features of " Cerebellar " and " Vestibular " Phenomena.—As a result of experiments performed on over 300 monkeys it was possible to differentiate clinically animals with cerebellar and those with vestibular lesions, thus simplifying the symptom elements associated with lesions of the gross cerebellum. (R. M. S.)

Sensory Discrimination after Lesions of Parietal Lobe.—The authors report the findings in parallel studies of the cortical localization for discrimination of roughness and of lifted weights in monkeys, chimpanzee, and man. (R. M. S.)

Dystonia musculorum deformans.—Four cases of dystonia musculorum deformans are described. The main lesions were in the striatum and dentate nucleus. Status marmoratus and status dysmyelinisatus were observed in three cases, and status fibrosus in one. The role of the striatum and dentate nuclei in the causation of extrapyramidal disorders and the relation of dystonia to these dyskinesias are discussed. (R. M. S.)

Astereognosis and Tumours of Foramen Magnum.—Eight cases of a tumour protruding through the foramen magnum with associated unilateral astereognosis are described. In this region tumours may give rise to sensory changes of the so-called cortical type which are probably due to pressure on, destruction of, or interference with the vascular supply of the posterior columns and their nuclei or the region of the decussation of the medial lemnisci. (R. M. S.)

Encephalitis occurring with Vaccination, Variola, and Measles.—Allergy is discussed as an important factor in the pathogenesis of encephalitis associated with vaccination, variola, and measles. (R. M. S.).

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*Descending Connections from the Hypothalamus. H. W. Magoun, S. W. Ranson, and A. Hetherington, 1,127.
*Vascular Pattern in Various Lesions of the Human Central Nervous System: Studies with the Benzidine Stain. A. C. P. Campbell, L. Alexander, and T. J. Putnam. 1,150.
Psychiatric Aspects of Artificial Fever Therapy. F. G. Ebaugh, C. H. Barnacle, and J. R. Ewalt. 1,203.
Convulsions Produced by Electrical Stimulation of the Cerebral Cortex of Unanæsthetized Cats. J. W. Ward and S. L. Clark. 1,213.
Sweat Secretion in Man. I. Sweating Response in Normal Persons. C. F. List and M. M. Peet. 1,228.
*Autonomic Innervation of the Face. II. An Experimental Study. F. H. Lewy, R. A. Groff, and F. C. Grant. 1,238.
Destruction of the Hypothalamus in Cats: Effects on Activity of the Central Nervous System and Its Reaction to Sodium Amytal. J. H. Masserman. 1,250.
Primary Ventricular Hemorrhage: Further Contribution to a Characteristic Symptom Group. A. Gordon. 1,272.
*Reduction of Increased Intracranial Pressure by Concentrated Solutions of Human Lyophile Serum. J. Hughes, S. Mudd, and E. A. Strecker. 1,277.
*Reduction of Cerebrospinal Fluid Pressure by Concentrated Lyophile Serum: Further Observations. D. Wright, D. Bond, and J. Hughes. 1,288.
*Direct Visualization of Dorsal Nerve-roots of the Cauda Equina by means of a Myeloscope. J. L. Pool. 1,308.

Descending Connections from Hypothalamus.—The information which these experiments have yielded regarding descending hypothalamic pathways may be summarized as follows: In the midbrain descending connections which mediate impulses induced by hypothalamic stimulation occupy a wide area in both the central and the tegmental region. At the pontine level the results fail to support any conception of an exclusive or predominant disposition of descending hypothalamic paths in either the periventricular or the midline region. Some connections are present in the medial portion of the pontile region of the brain stem, but sections must be extended practically to the lateral margins of the tegmental formation to impair seriously or to abolish the responses to hypothalamic stimulation. If there is any concentration of descending hypothalamic paths at this level, these experiments point toward the pontile tegmentum as containing the area concerned.

Stimulation after hemisection reveals that even as far caudad as the first cervical segment of the spinal cord the connections which carry descending impulses from the hypothalamus are chiefly uncrossed, but that there is a smaller crossed component in the paths concerned with the respiratory and vasomotor effects. (R. M. S.)

Vascular Pattern in C.N.S. Lesions.—A study of the vascular architecture in neuropathological lesions by the use of Lepehne-Pickworth's benzidine stain. (R. M. S.)

Autonomic Innervation of Face.—The results of the authors' investigations show that the pseudomotor phenomena of the eyelid, the lip, the whiskers, and the tongue of cats may be elicited by stimulation of (1) autonomic efferent fibres in the sensory root or sensory divisions of the fifth nerve originating in the mesencephalic nucleus of the nerve, and (2) the preganglionic and postganglionic fibres of the cervical portion of the sympathetic trunk. (R. M. S.)

Reduction of Intracranial Pressure by Lyophile Serum.—Concentrated human blood serum was found to be an extremely effective dehydrating agent for reducing intracranial pressure, and its ability to raise blood pressure indicates that it should be useful in the treatment of circulatory failure due to shock or hæmorrhage. (R. M. S.)

Reduction of C.S.F. Pressure by Lyophile Serum.—In dogs 8 c.c. of serum per kilogram maintained a reduction in pressure for longer than 20 hours. (R. M. S.)

Visualization of Dorsal Nerve Roots by Myeloscope.—An instrument is described which permits direct visualization of the contents of the subarachnoid space within the spinal cord. The dorsal roots of the cauda equina can be seen as well as their blood-vessels. In addition, the actual flow of blood through the vessels can be perceived. (R. M. S.)

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Structure of the Filum Terminale. I. M. Tarlov. 1.
*Encephalographic Findings in Cases of Athetosis and Related Disorders. T. J. Putnam and T. J. C. von Storch. 18.
*Sweat Secretion in Man. II. Anatomic Distribution of Disturbances in Sweating associated with Lesions of the Sympathetic Nervous System. C. F. List and M. M. Peet. 27.
*Vesical Abnormalities associated with the Parkinsonian Syndrome. O. R. Langworthy. 44.
*Cevitamic Acid Content of Blood Plasma in Alcoholic Psychoses. L. Alexander, M. Pijoan, P. G. Schube, and M. Moore.
*Variations in Magnesium and Potassium associated with Essential Epilepsy. A. D. Hirschfelder and V. G. Haury. 66.
A Method of testing Cortical Function and Sensitivity of the Skin: an Aid in Differentiating Organogenic and Psychogenic Disturbances. W. H. Gantt. 79.
Dangerous Effect of Thorotrast used intracranially, with Special Reference to Experimental Production of Hydrocephalus. R. M. Stuck and D. L. Reeves. 86.
*Metabolic Studies during Insulin Hypoglycemia Therapy of the Psychoses. M. M. Harris, J. R. Blalock, and W. A. Horwitz. 116.
Effects of Hypoglycemia and Anoxia on the Central Nervous System: a Basis for a Rational Therapy of Schizophrenia. E. Gellhorn. 125.

Encephalographic Findings in Athetosis.—In a series of 13 cases of athetosis and dystonia encephalography has been performed. Certain changes appear with considerable constancy in the roentgenograms. They include: enlargement of one or both ventricles, especially at the

expense of the floor of the ventricle; enlargement of the third ventricle in a direction away from the clinically affected side; and enlargement of the basal cistern. Similar changes are occasionally seen in other conditions characterized by enlargement of the ventricles. In general, however, in the cases of athetosis the basal atrophy is more marked as compared with the size of the ventricles and the cortical atrophy than it is in other diseases. Indications for employment of encephalography in relation to diagnosis, prognosis, and operation are discussed. (R. M. S.)

Sweat Secretion in Man (2).—Localized lesions of the sympathetic chain and of its rami lead to circumscribed loss of thermoregulatory sweating. The area of anhidrosis is frequently bounded by a zone of increased perspiration (so called prelesionary hyperhidrosis). The typical areas of anhidrosis which occur after various forms of sympathectomy are described. The postganglionic sweat fibres contained in the grey communicant rami supply the skin in a segmental manner corresponding to the sensory radicular innervation. The thermoregulatory sweating test is a simple and accurate clinical method to determine the extent and site of lesions in the sympathetic nervous system. (R. M. S.)

Vesical Abnormalities in Parkinsonian Syndrome.—Certain patients with the parkinsonian syndrome complain of frequency of micturition. Graphic records of versical activity may reveal two abnormalities. The resting intravesical pressure is abnormally high both in the empty bladder and during filling. The volume of the bladder is often decreased. The stretch reflex in the muscle is not usually hyperactive. The pathological changes in these patients are not sharply localized or limited to one group of cells or fibres. For this reason, the records of vesical activity are not exactly similar, as they are after injury of the corticospinal tracts. The discussion is concerned with the explanation for these differences in vesical activity. (R. M. S.)

Cevitamic Acid Content of Blood Plasma in Alcoholic Psychoses.—Patients with chronic alcoholism have a diminished cevitamic acid content of the plasma as compared with persons used as controls. In some instances the cevitamic acid level in the blood is as low as that in subclinical scurvy. (R. M. S.)

Magnesium and Potassium associated with Epilepsy.—The plasma magnesium is frequently low during the convulsions of essential epilepsy. The ultrafiltrable magnesium is low more frequently and is proportionately lower than the total plasma magnesium. The plasma potassium increases during epileptic convulsions. The molar potassium/magnesium, especially the ultrafiltrable potassium/ultrafiltrable magnesium ratio, increases during epileptic convulsions. The phosphate and dextrose contents of the blood increases during epileptic convulsions. All these abnormalities are most intense in the severest forms and are less frequent and less intense before and after the convulsions. They tend to return to normal between periods of convulsions. The magnesium and potassium of the cerebrospinal fluid usually remain normal during convulsions. The magnesium content of the cerebrospinal fluid remains higher than that of the plasma; the potassium remains lower. Continuous oral administration of magnesium did not ameliorate nor did potassium chloride aggravate the epileptic seizures. (R. M. S.)

Metabolic Studies during Insulin Hypoglycæmia Therapy.—A study has been made of concomitant metabolic changes occurring during the hypoglycæmic state in psychotic patients treated with insulin. In addition to lowering of the blood sugar, changes were observed in amino-acids, potassium, inorganic phosphorus, cholesterol, and serum protein. The importance of some of these changes in the physiologic relations of the nervous system is discussed. The possible significance of a marked and persistent lowering of serum potassium observed in a small group of patients is pointed out. The severity of the changes was not dependent on the size of the dose of insulin administered. (R. M. S.)

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*Biopsy Studies of Cerebral Pathologic Changes in Schizophrenia and Manic-Depressive Psychoses. A. R. Elvidge and G. E. Reed. 227.
*Sweat Secretion in Man. III. Clinical Observations on Sweating Produced by Pilocarpine and Mecholyl. C. F. List and M. M. Peet. 269.
*Intracerebral Blood Flow: an Experimental Study. N. C. Norcross. 291.
*Mechanism of After-Contraction: Further Studies. M. R. Sapirstein, R. C. Herman, and I. S. Wechsler. 300.
Intercellular Substance of the Cerebral Cortex (Nissl's Cerebral Gray Matter). Physiologic Significance. A. E. Taft. 313.
*Moro Reflex and Startle Pattern. K. Goldstein, C. Landis, W. A. Hunt, and F. M. Clarke. 322.

Cerebral Pathologic Changes in Schizophrenia.—Removal of specimens of cerebral cortex for biopsy demonstrated that a pathological change affecting the oligodendroglia cells of the brain operates in cases of schizophrenia and manic-depressive psychosis. (R. M. S.)

Sweat Secretion in Man (3).—Sweating responses following subcutaneous injection of pilocarpine and mecholyl were studied in man under physiological and pathological conditions. The influence of obstruction

of the circulation and of various lesions of the nervous system was investigated. When injected subcutaneously, pilocarpine and mecholyl act on the periphery through the circulating blood. They have apparently no effect on the central nervous system. Pilocarpine and mecholyl stimulate the endings of cholinergic nerve fibres. Administered subcutaneously in customary doses, both drugs usually show no visible direct action on the sweat glands. There is evidence that two sets of cholinergic fibres exist : (1) postganglionic sympathetic, and (2) parasympathetic cholinergic fibres. The majority of the cholinergic fibres for the trunk and extremities seem to pass through the thoracolumbar sympathetic system. The cholinergic fibres supplying the head, however, travel largely via cranial parasympathetic nerves. Cholinergic fibres convey nerve impulses indirectly to their end organs by releasing a substance with the properties of acetylcholine. This chemical transmitter may produce an effect on sweat glands, even though the cholinergic fibres (at least those of parasympathetic origin) make no direct anatomical contact with the sweat glands. Sweat glands deprived of their postganglionic sympathetic innervation tend to become hypersensitive to direct chemical stimulation, in particular, the deefferented sweat glands of the face may show sensitization to acetylcholine liberated by the remaining parasympathetic cholinergic fibres. (R. M. S.)

Intracerebral Blood Flow.—In the parietal area of the cat's brain, with the animal under dial anæsthesia, the following observations were made. The vagus nerve has no direct effect on the blood flow through either side of the brain. Stimulation of the cervical portion of the sympathetic chain causes a decrease in the blood flow on the ipsilateral side. Carbon dioxide is a powerful agent in increasing the blood flow. Inhalation of pure oxygen or hyperventilation with atmospheric air causes a decrease in the blood flow. Epinephrine, ephedrine, and solution of posterior pituitary increase the blood flow secondarily to the increase in blood pressure. Caffeine, acetylcholine, and acetylbetamethylcholine cause an increase in the blood flow, in spite of depressed blood pressure. Amyl nitrite in moderate amounts maintains the rate of blood flow in spite of depressed blood pressure. Histamine decreases the blood flow secondarily to the decrease in blood pressure. Hypertonic solutions of sodium chloride cause an increase in the blood flow. (R. M. S.)

Mechanism of After-Contraction.—After-contraction is the involuntary movement which follows prolonged muscular contraction in man. It may be elicited when any set of muscles is voluntarily kept in action for a time against resistance. After relaxation of the contracting muscles and subsequent removal of the resistance, there usually follows an involuntary repetition of the originally intended movement, accompanied by a sensation of lightness or floating upward of the part. It is concluded that the after-contraction is mainly an after-discharge from the cortex or its projection pathways. It is modified by other parts of the nervous system, as is voluntary activity. Suggestions are offered concerning the usefulness of after-contraction as a method of investigating the physiological behaviour of the cortex and of studying drugs used in controlling its excitability. Theoretical views are advanced as to the possible role of after-contraction in habit formation. (R. M. S.)

Moro Reflex and Startle Pattern.—Both the Moro reflex and the startle pattern may be called forth in infants by the same stimulus. While the Moro reflex gradually disappears, being usually gone by the fourth month of life, the startle pattern becomes regular and perseveres throughout life. Examination of the Moro reflex shows it to consist of two phases : a primary extension of the upper extremities and a subsequent flexion or " clasping " movement. The primary extension is the important part of the response and the secondary " clasping " movement may represent merely the influence of normal postural habits. It thus seems erroneous to refer to the Moro reflex as an adaptive, protective, clasping response. It is rather a phenomenon representative of cortical immaturity. (R. M. S.)

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*The Cerebral Cortex in Man. I. The Cerebral Cortex and Consciousness. W. Penfield. 417.
*Sweat Secretion in Man. IV. Sweat Secretion of the Face and Its Disturbances. C. F. List and M. M. Peet. 443.
Quantitative Olfactory Tests : Value in Localization and Diagnosis of Tumors of the Brain, with Analysis of Results in Three Hundred Patients. C. A. Elsberg and J. Stewart. 471.
*Margins of the Optically Excitable Cortex in the Rabbit. J. L. O'Leary and G. H. Bishop. 482.
*Effect of Lesions in the Vestibular Part of the Cerebellum in Primates. R. S. Dow. 500.
Acute Amaurotic Epilepsy in Macacus Rhesus. L. van Bogaert and H. J. Scherer. 521.

The Cerebral Cortex in Man.—An outstanding contribution to the study of the function of the cerebral cortex based on stimulation of the cerebral cortex in conscious patients. (R. M. S.)

Sweat Secretion in Man (4).—The sweating responses of the face were studied with Minor's iodine and starch method in patients presenting nerve lesions. The distribution of the sympathetic sweat fibres was determined by the thermoregulatory sweating

test. The postganglionic sweat fibres arising in the superior cervical ganglion either pass through the periarterial plexus of the external carotid artery or are carried into the cranium via the periarterial plexus of the internal carotid artery (internal carotid nerve). The trigeminus nerve receives its sweat fibres distal to the gasserian ganglion. Most of the fibres for the ophthalmic branch probably enter this nerve intracranially, whereas the fibres destined for the second and third divisions join these nerves extracranially. The peripheral branches of the fifth nerve contain all sweat fibres for the trigeminal area. There is no definite proof that the facial nerve carries sympathetic sweat fibres, except perhaps a few for the auriculotemporal and parotid areas (anastomotic branches from the auriculotemporal and greater auricular nerves). The intracranial portions of the glossopharyngeal, the greater superficial petrosal, and the chorda tympani nerves contain no sympathetic sweat fibres. Perspiration of the face is produced also by stimulation of so-called cholinergic fibres, which act indirectly by releasing a chemical transmitter, probably acetylcholine. Not only various parasympathetic nerves (fifth, seventh, ninth, and tenth) but some of the postganglionic fibres of the cervical portion of the sympathetic chain have cholinergic properties. A "cholinergic sweating" response can be elicited in two ways: (1) a generalized response of the whole body follows administration of parasympathomimetic drugs, such as pilocarpine or mecholyl; (2) a neurodynamic response, confined to the face, is produced by the gustatory salivary reflex. After degeneration of a peripheral branch of the trigeminal nerve cholinergic, like thermoregulatory, sweating is abolished in the distribution of this nerve. After postganglionic sympathetic denervation (superior cervical ganglionectomy) the cholinergic response may be diminished, or it may be increased because the deefferented sweat glands become sensitized to acetylcholine. Gustatory sweating depends on the reflex stimulation of cranial cholinergic fibres. A faint gustatory sweating response is present in many normal persons. Pathological gustatory sweating response is present in many normal persons. Pathological gustatory hyperhidrosis occurs: (1) in sympathectomized areas, probably owing to sensitization to acetylcholine; and (2) as the auriculotemporal syndrome, which is explained by abnormal local irritability of cholinergic fibres. (R. M. S.)

Optically Excitable Cortex in Rabbit.—Treatment of the optically excitable cortex was studied by recording the characteristic interruptions of the spontaneous rhythm which followed the application of single maximal electrical shocks to the contralateral optic nerve. Comparisons were made between the extent of the optically excitable area in histological preparations used as controls and that of the area striata as delimited in the Rose cytoarchitectonic parcellation of the cortex of the rabbit. The optically excitable area is more extensive than the area striata as delimited by Rose in that it extends across the peristriate field (Pstr) medially and may enter area parietalis 3 anteriorly. Laterally, it follows Rose's zone of transition between the striate (Str) and the occipital (Oc) field to the posterior pole of the hemisphere. (R. M. S.)

Lesions in Vestibular Part of Cerebellum.—The work indicates that localization of function, based on comparative anatomical facts and afferent fibre connections, may be demonstrated to exist in the cerebellum of monkeys and chimpanzees. The similarity between this syndrome and that seen in cases of cerebellar tumours which originate in this part of the vermis is mentioned. (R. M. S.)

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Vol. 108. No. 4. July 1938.

Beiträge zu den Zeichnenstörungen autotopagnostisch aphatischer Kranken. (Disturbances of drawing in autotopagnostic and aphasic patients.) L. V. Angyal and B. Lorand. 493.

Ueber die pathoplastische und konstitutionsbiologische Bedeutung der "vegetativen Stigmatisierung" in der Psychiatrie. (Pathoplastic and constitutional significance of vegetative stigmatization in psychiatry.) J. Hempel. 517.

Über Geschlechtshäufigkeit, Jahreskurven und Beginn der Schizophrenie. (Incidence of sex, annual rhythm, and onset in schizophrenia.) M. Haas. 552.

*Bemerkungen über das Verhalten des Liquor cerebrospinalis waehrend des Cardiazolkrampfes. (Cerebrospinal fluid during cardiazol fits.) B. Niketic and S. Zvonimir. 562.

Psychische Veränderungen bei Lepra. (Psychological changes in leprosy.) N. T. v. Swerbejew, v. 572.

Zur Frage der Eklampsiepsychosen. (Psychosis in eclampsia.) H. Stahl. 594.

Cerebrospinal Fluid during Cardiazol Fits.—During the initial phase of myoclonic twitchings, the pressure in the cerebrospinal fluid commences to increase. The increase is greatest during the tonic and at the beginning of the clonic phase. The laboratory findings in the cerebrospinal fluid show no abnormalities. (A. M.)

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Die Bedeutung der Wurzelnervveränderungen bei der menschlichen Tetanusinfection. (Significance of nerve-root changes in human tetanus.) L. Benedek and A. Juba. 609.
Zur Frage der hirnpathologischen Erscheinungen des Insulinshocks. (Manifestations of disturbed function of the brain in insulin shock.) C. Palisa. 633.
Über konsanguine juvenile Tabo-Paralyse. (Consanguineous juvenile tabo-paralysis.) F. Wawrzik. 661.
Polyneuritis cerebralis idiopathica. I. Glavan. 668.
Über das Verhalten des Blut und Liquorzuckers bei der Insulinshockbehandlung der Schizophrenie. (Blood and C. S. F. sugar in insulin treatment of schizophrenia.) V. Schretzenmayr. 680.

BRAIN

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Pick's Disease—A Specific Type of Dementia. I. C. Nichols and W. C. Weigner. 237.
The Thalamus of the Chimpanzee. A. E. Walker and J. F. Fulton. 250.
The Tonic Foot Response to Stimulation of the Sole: Its Physiological Significance and Diagnostic Value. K. Goldstein. 269.
*Note on the Nucleus Ruber Magnocellularis and Its Efferent Pathway in Man. K. Stern. 284.
*The Local Sweat Response to Faradic Stimulation. R. W. Wilkins, H. W. Newman, and J. Doupe. 290.
Dissemination of a Glioma of the Spinal Cord in the Leptomeninges. K. C. Eden. 298.
*Fibrillation and Fasciculation in Voluntary Muscle. D. Denny-Brown and J. B. Pennybacker. 311.

Efferent Pathway of Ruber Magnocellularis.—Retrograde chromatolytic changes were observed in the nucleus ruber magnocellularis (v. Monakow) in serial sections of the midbrain of two cases. One with a transverse lesion of the thoracic cord showed bilateral changes in the nuclei, and the other had changes on the contralateral side only, following thrombosis of a posterior inferior cerebellar artery. Correlating these findings with those observed in animals and with earlier observations on tract degeneration in man it is concluded that a rudimentary paleo-rubrum and rubro-spinal tract exist in man. There has been a phylogenetic deterioration in the size of these structures. (D. J. W.)

Sweat Response to Faradic Stimulation.—Stimulation of the skin of the forearm in man with a faradic current resulted in a local sweat response which was demonstrated by the iodine-starch method of Minor. Study of modifications in the response with lesions in the peripheral somatic and sympathetic nerves suggested that it was dependent on a local axone reflex of the postganglionic sympathetic fibres. It appears that single sympathetic nerve fibres divide near their terminations into many fine filaments which supply a group of sweat glands. A complicated system of axone reflexes can take place through this system of filaments. There appears to be considerable overlap in the distribution of these neurone systems. (D. J. W.)

Fibrillation in Voluntary Muscle.—Simultaneous records were obtained of the electrical and mechanical activity of voluntary muscle undergoing degeneration as a result of various lesions in the muscle, its motor nerve, and in the anterior horn cell. Different types of spontaneous movement result from these different lesions. The fine fibrillation of degenerating muscle discharges from abnormal anterior horn cells and the coarse, slow twitches resulting from intramuscular nerves could be distinguished. The discharge from degenerating anterior horn cells is regular and causes a rhythmic fasciculation which is distinct from the " contraction fasciculation " of voluntary movement. The fibrillation of denervated muscle is extremely fine, and appears to be due to increased excitability of the rapidly conducting portion of muscle fibres to traces of free acetyl-choline in the tissues. The contracture of facial muscles is unique in re-innervated muscle, and appears to be of central origin. The slow undulating fascicular contraction seen in fatigue and in $NaCl$ deficiency are caused by contraction which begins in and spreads throughout the muscle fasciculus. The nature of these different types of involuntary muscle movements have been related to what is known of the anatomy of the neuromuscular mechanism. (D. J. W.)

BULLETIN OF THE NEUROLOGICAL INSTITUTE OF NEW YORK

Vol. 7. No. 2. September 1938.

*Relapsing Juvenile Chronic Subdural Hematoma. L. M. Davidoff and C. G. Dyke. 95.
Chronic Subdural Hematoma. A Roentgenographic and Pneumencephalographic Study. C. G. Dyke and L. M. Davidoff. 112.
The Neural Components of Light and Dark Adaptation and their Significance for the Duration of the Foveal Dark Adaptation Process. C. A. Elsberg and H. Spotnitz. 148.
The Relation between Area and Intensity of Light and the Size of the Pupil, with Formulas for Pupillary Reactions. C. A. Elsberg and H. Spotnitz. 160.
A Comparison of a Series of Olfactory and Visual Tests for the Localization of Tumors of the Brain. C. A. Elsberg and H. Spotnitz. 165.
Subjective Foveal Hemaniopsia during Dark Adaptation in Patients with Tumors of a Temporal Lobe. H. Spotnitz. 170.
The Sense of Taste. Formulas by which the Relations between Stimulus and Reaction Time can be Foretold. C. A. Elsberg and H. Spotnitz. 174.
Myeloscopy: Diagnostic Inspection of the Cauda Equina by Means of an Endoscope (Myeloscope). J. L. Pool. 178.
A Comparison of the Spinal Fluids in Active and

Inactive Cases of Multiple Sclerosis. S. M. Dillenberg. 190.
A Comparison of the Symptoms of Glioblastoma Multiforme and Fibrillary Astrocytoma of the Temporal Lobe. R. T. Collins. 195.
The Laterality of Signs and Symptoms in a Series of Pathologically Verified Tumors of the Brain. T. E. Bamford. 201.

Relapsing Juvenile Subdural Hæmatoma.—The authors suggest this title for a syndrome which was presented by four cases, reported in detail. Greatest stress is laid on the history and the radiological findings, on which the diagnoses were made. The patients were 6 to 16 years of age and their history gave evidence of an initial injury 5 to 11 years before, with a subsequent injury 2 to 12 months before admission to hospital. In one of the four cases a difficult labour was followed by an enlarged head and slight mental retardation. The other three had had severe head injuries in early life. There were no abnormal signs in the central nervous system after the first injury and inconstant localizing signs after the second injury. There was, however, evidence of increased intracranial pressure. The X-ray findings included enlargement of the middle fossa, with raising of the sphenoid ridge and superior orbital plate, with thinning of the post-orbital bony landmarks. The ventricles showed slight lateral deviation and tilting. The onset of the abnormality and its presenting signs were indefinite. (D. J. W.)

L'ÉNCEPHALE

Vol. 33 (1). No. 1. January 1938.

Langage et Mouvement. (Speech and Movement.) J. Phermitte. 1.
Considérations sur l'Aphasie Croisée. (Considerations on crossed aphasia.) G. Marinesco, D. Grigoresco, and S. Axente. 27.
Syndrome de Landry et Syphilis. (Landry's syndrome and syphilis.) H. Roger, J. Paillas, and J. Vague. 47.

Vol. 33 (1). No. 2. February 1938.

Contributions à l'Étude des Centres Vestibulaires Corticaux et des Hallucinations Lilliputiennes. (Contributions to the study of cortical vestibular centres and lilliputian hallucinations.) G. de Morsier. 57.
Recherches Histologiques sur les Voies Optiques. Le Chiasma Optique d'un Borgne. (Histological researches on the optic pathway.) P. Quercy and R. de Lachaud. 73.
Douleurs Centrales d'Origine Bulbo-Protubérantielle. (Central pains of bulbar origin.) J. Ajuriaguerra and G. Daumezon. 77.
Paralysie Générale Évoluant au Début sous le Masque d'une Striatite Syphilitique. (General paralysis commencing in the form of syphilitic Parkinsonism.) H. Claude and J. Cuel. 97.

Vol. 33 (1). No. 3. March 1938.

Les Tendances Actuelles en Psychothérapie. (The present tendencies of psycho-therapy.) W. Malamud. 105.
Le Trouble Aphasique ne Constitue pas un Déficit Statique. (Aphasia does not constitute a static disorder.) P. Delmas-Marsalet. 123.
Nouveau Signe dans les Hémiparésies. (A new sign in hemiparesis.) E. Herman. 132.

Vol. 33 (1). No. 4. April 1938.

Historique de l'Origine du Traitement de la Schizophrenie par le Choc Insulinique. (An account of the origin of the treatment of schizophrenia by insulin shock.) M. Sakel. 153.
Dynamique de la Schizophrénie sous l'Influence des Narcoses Prolongées. (Dynamics of schizophrenia under the influence of prolonged narcosis.) B. Guiliarovski. 165.
Les Corrélations Colloidales dans le Plasma des Schizophrènes. (Changes in the plasma colloids in schizophrenia.) S. Schrijver-Hertzberger. 181.
Essai sur le Rôle de la Syphilis dans le Déterminisme de la Démence Précose. (The rôle of syphilis in determining dementia præcox.) P. Faveret and J. Rondepierre. 194.

Vol. 33 (1). No. 5. May 1938.

Les Tumeurs Perlées du Névraxe. (Cholesteatomas of the nervous system.) H. Askensay. 209.
Délire Passionel et Sclérose Multiloculaire. (Delirium and multilocular sclerosis.) Aubin and A. Barraux. 239.
L'Électro-encéphalographie Clinique. Technique et Résultats du Central Pathological Laboratory of the Maudsley Hospital de Londres. (The electro-encephalography clinic. Technique and results from the Central Pathological Laboratory of the Maudsley Hospital, London.) J. Golse. 244.

Vol. 33 (2). No. 1. June 1938.

Hallucinations Mescaliniques et Troubles Psycho-Sensoriels de l'Encéphalite Epidémique Chronique. (Mescaline hallucinations and psychosensory disorders of chronic epidemic encephalitis.) H. Ey and M. Rancoule.
Les Modifications de la Chronaxie Vestibulaire Déterminées par l'Alcohol chez les Alcoholiques. (Changes in vestibular chronaxie produced by alcohol in alcoholics.) C. Niemirowicz-Szczytt. 26.
Les Modifications de la Chronaxie Vestibulaire chez les Lapins sous l'Influence de l'Alcohol. (Changes in vestibular chronaxie of rabbits under the influence of alcohol.) M. Brun. 46.

Vol. 33 (2). No. 2. July–August 1938.

Conception Clinique des Neuronoses et des Neuromyéloses. (Clinical outline of the neurites and neuromyelites.) A. Austregesilo. 61.
Rémissions Spontanées et Rémissions Thérapeutiques. (Spontaneous and therapeutic remissions.) G. Teulié. 82.
Observations sur l'Application du Traitement par le Cardiazol à quelques Cas de Schizophrénie. (Observations on the cardiazol treatment in certain cases of schizophrenia.) G. Pamboukis and J. Tsiminakis. 94.
Contributions aux Études Biotypologiques dans la Schizophrénie. Les Groupes Sanguins, la Constitution et la Race. (Contributions to the biotypological study of schizophrenia: blood groups, constitution, and family.) J. Prokop, O. Skalickova, and J. Cupik. 104.

JOURNAL OF ANATOMY

Vol. 72. No. 4. July 1938.

*The Thalamus of the Cat after Hemidecortication. W. H. Waller. 475.
*The Connections of the Posterior Commissure. M. F. L. Keene. 488.
*Observations on the Problem of the Proprioceptive Innervation of the Tongue. A. Carleton. 502.
The Innervation of the Ovary, Uterine Tube, Testis and Epididymis. G. A. G. Mitchell. 508.
*On the Localization of Nerve Centres of the Extrinsic Ocular Muscles in the Oculomotor Nucleus. Shafik Abd-El-Malek. 518.
*On the Presence of Sensory Fibres in the Ocular Nerves. Shafik Abd-El-Malek. 524.
The Innervation of the Human Gum. W. Lewinsky and D. Stewart. 531.
The External Morphology of the Brain of the Tortoise Testudo Geometrica. G. W. H. Schepers. 535.

Thalamus of Cat after Hemidecortication.—In four cases of nearly complete hemidecortication in the cat, with varying amounts of injury to subcortical structures, complete degeneration was found in the antero-ventral, ventromedial, ventrolateral, arcuate and lateral posterior nuclei, the pulvinar and the geniculate bodies. There was nearly complete degeneration of the lateral anterior and ventral anterior nuclei, and partial degeneration of the anterodorsal, anteromedial, recticular, medial, paracentral, and central lateral nuclei, and the centrum medianum, indicating that these nuclei have both cortical and subcortical efferent fibres. No cell changes were found in the paratænial, paraventricular, or central nuclei, or in the group of nuclei about the posterior commissure, nor was there any definite degeneration in the ventral nucleus of the lateral geniculate body. (A. G. M. W.)

Posterior Commissure.—An extensive amount of material was examined which included serial sections of the brains of 44 human fœtuses ranging from 9 mm. to 9 months, and serial sections of brains of 21 specimens of vertebrate animals. The investigation included the examination of a Rhesus monkey brain stained by the Marchi method, in which the posterior commissure had been cut experimentally. The chief connections of the posterior commissure were found to be as follows. A ventral group present throughout the series, consisting of coarse fibres which in mammals connect with the nuclei of the commissure. Coarse fibres which connect with the tegmental region. Fine horizontal laterally placed fibres, possibly providing a striatal connection. Fine fibres connecting with the thalamus. Fibres connecting with the tectum, found only in chameleon and in frog. (A. G. M. W.)

Proprioceptive Innervation of Tongue.—The proximal part of the hypoglossal was cut in nine rabbits and time allowed for degeneration, varying from 6 to 21 days. Except for one doubtful instance, no evidence was found to support Tarkhan's suggestion that ganglion cells exist along the course of this nerve. Using a pyridine silver method on the tongue, no muscle spondles were found in the tongue of the rabbit or in the prehensile tongues of the chameleon (Chamæleon dilapis) and the anteater (Myrmecophaga tridactyla). The lingual nerve in one rabbit was cut on one side and the hypoglossal nerve on the other. Pyridine-silver staining revealed nerve terminals in relation to muscle fibres of the tongue on the side where the lingual had been cut, but were absent on the other side. The mucous membrane of the tongue and mouth was anæsthetized with 5 to 10 per cent. cocaine in eight persons. All sense of position of the tongue was lost in four, partial loss in three, and no loss in one case. (A. G. M. W.)

Nerve Centres of Extrinsic Ocular Muscles.—The oculomotor nucleus in the cat is well developed, but its subdivisions are not very distinct, a paramedian nucleus is missing. The Edinger-Westphal nucleus is clearly seen on either side. Its cells resemble those of the Tsuchida nucleus both in size and shape. The central nucleus of Perlia in this animal is concerned with the nerve supply of the medial rectus muscle. Enucleation experiments resulted in chromatolysis in the cells of the nuclei of both sides, those of the same side being much the most affected. Avulsion of individual muscles resulted in chromatolysis in certain areas indistinctly localized from the rest of the nuclear cells. Chromatolysis was often bilateral. After enucleation chromatolysis was observed in both trochlear nuclei, but most pronounced on the side opposite to that operated upon. (A. G. M. W.)

Sensory Fibres in Ocular Nerves.—The

third, fourth, and sixth cranial nerves of dogs were isolated and cut, and the central ends stimulated intradurally both electrically and mechanically. Each stimulus gave rise to a reflex rise in blood pressure. It was concluded that sensory fibres were incorporated in these nerves when they emerged from the brain. (A. G. M. W.)

Vol. 73. No. 1. October 1938.

A Note on the Interparietal Groove in Egyptian Skulls. L. R. Shore. 1.
A Contribution to the Study of the Movements of the Tongue in Animals, with Special Reference to the Cat. S. Abd-El-Malek. 15.
Platymeria and Platycnemia. L. H. D. Buxton. 31.
*The Thalamus of the Chimpanzee. IV. Thalamic Projections to the Cerebral Cortex. A. E. Walker. 37.
The Blood Supply of Heart Values in Relation to Endocarditis. W. F. Harper. 94.
The Tendon of the Lateral Pterygoid Muscle. J. A. Harpman and H. H. Woollard. 112.
The So-Called Maxillary Antrum of the Gorilla. F. W. Jones. 116.
*The Production of Cortical Lesions by Devascularization of Cortical Areas. S. Sunderland. 120.
*The Occurrence of Wandering Cells in Cultural Nervous Tissue *in vitro*, and the Changes in their Form in Various Media. W. Jablonski and H. Meyer. 130.
The Effect of Sex-Hormone on the Bulbo-Urethral Glands of Rhesus Monkeys. O. E. Aykroyd and S. Zuckerman. 135.
Experiments on the Development of the Pronephric Duct. R. J. O'Connor. 145.
A Resurvey of the Anatomical Features of the Piltsdown Skull, with some Observations on the Recently Discovered Swanscombe Skull. A. Keith. 155.

Thalamus of Chimpanzee.—For an examination of the retrograde cell degeneration in the thalamic nuclei after large and small cortical lesions in the chimpanzee the thalamic projection to the cortex was shown to be as follows: (1) The large medial nucleus (nucleus medialis dorsalis) sends its fibres exclusively to the granular frontal cortex (prefrontal region). (2) The nucleus ventralis lateralis (anterior half of the lateral nuclear mass) projects to the motor and premotor areas. (3) The nucleus ventralis posterior (ventral portion of the posterior moiety of the lateral nuclear mass) sends its fibres exclusively to the postcentral convolution. (4) The projection from the lateral nuclear mass to the central gyri has a precise arrangement. The medial portions send their fibres to the inferior pre- and postcentral convolutions, the lateral portions to the superior part of the central gyri, and the intermediate portions project to the intervening cortex of the pre- and postcentral convolutions. (5) The pulvinar projects to the posterior portions of the parietal and temporal lobes. The nucleus puivinaris lateralis sends its fibres to the posterior part of the superior parietal lobule; the nucleus pulvinaris medialis to the supramarginal gyrus, and the nucleus pulvinaris inferior to the temporo-occipital region. (6) The anterior nuclei presumably project to the cingular gyrus. (A. G. M. W.)

Devascularization of Cortical Areas.—The blood supply of the cerebral cortex in macaque monkeys was investigated experimentally by obliterating the superficial supply from the pial vessels and examining the resultant degenerative changes, and also by isolating cortical areas without interruption of the pial vessels to determine the part played by deep medullary arteries in the supply of the deepest cell laminæ. The cerebral cortex receives its entire effective supply from the superficial pial vessels. Ascending vessels from the subjacent medulla are functionally insignificant. Although anastomoses are present, the individual pial vessels function as end arteries. The extent to which subjacent medulla is supplied from superficial cortical vessels varies. In small lesions involving narrow, well folded convolutions, the medullary damage is a minimum, and almost certainly involves only the fibres arising in the devascularized area. In larger lesions, involving the summit of larger, less convoluted areas, the medullary damage extends more deeply and involves the area composed predominantly of the fibres arising from the devascularized cortex. It is concluded that devascularization is preferable to ablation in producing cortical lesions, because it is simpler, just as effective if not more so, does not involve instrumental interference with the cortex, and allows an identical lesion to be repeated. (A. G. M. W.)

Wandering Cells in Cultural Nervous Tissue.—If cultivated by the technique of Fischer and Parker, the free wandering cells around the cultures of retina and brain, which in the first days have the character of "macrophages," transform into "histiocytes." The histiocytes retain their form for months, and divide mitotically. The same cells with the same transformations appear in cultures of non-nervous tissue. (A. G. M. W.)

JOURNAL BELGE DE NEUROLOGIE ET DE PSYCHIATRIE

Vol. 38. No. 8. August 1938.

*Etudes sur le Mode d'Extension et l'Histo-Pathologie des Trypansomiases Expérimentales. (Studies on the mode of extension and the histopathology of experimental trypanosomaniasis.) L. v. Bogaert and A. Dewulf. 559.
*Sur un Processus Nécrotisant Milaire d'Origine Inconnue, chez Macacus Rhesus, se Présentant Cliniquement sous Forme d'une Cécité. (A necrotic miliary process of unknown origin in the Macacus Rhesus, showing the clinical presentation

of blindness.) L. v. Bogaert and A. Dewulf. 583.

Nouvelles Contributions au Problème des Troubles Psychiques dus à des Lesions de la Région Frontale. (Fresh contributions to the problem of psychic disturbances due to lesions of the frontal region.) K. H. KARST. 598.

L'Insulino-Thérapie de la Schizophrenie dans une Clinique Anglaise. (Insulin therapy for schizophrenia in an English clinic.) G. W. B. James, R. Freudenberg, and T. Cannon. 604.

Le Pentaméthylènetétrazol Injecté dans les Muscles à Doses Moyennes et Répétées, Calme Souvent l'Anxieté du Mélancholique et Guérit de même l'Eczéma, l'Urticaire et vraisemblablement d'autres Syndromes de la même Famille ; Asthme, Migraine, etc. (Pentamethylenetetrazol injected into muscles in average repeated doses, frequently calms the anxiety of the melancholic and at the same time heals eczema, urticaria and other similar syndromes of the same family : asthma, migraine, etc.) A. Leroy. 613.

Histopathology of Trypanosomiasis.—An experimental study of changes in the nervous system associated with infection by Trypanosoma Gambiencis. Excellent article with many illustrations. (E. A. C.)

Necrotic Military Process with Clinical Presentation of Blindness.—A record with pathological material of an acute encephalitis affecting monkeys. (E. A. C.)

Vol. 38. No. 9. September 1938.

First Report : Psychiatry.

Les Rapports Cliniques entre les Encéphalites et la Démence Précoce. (Clinical resemblance between encephalitis and dementia præcox.) G. Vermeylen. 647.

Second Report : Neurology.

Les Affections Parenchymateuses du Cervelet et leur Signification du Point de Vue de l'Anatomie et de la Physiologie de cet Organe. (Parenchymatous diseases of the cerebellum and their significance from the point of view of the anatomy and physiology of this organ.) B. Brouwer and A. Biemond. 691.

This number is devoted to the reports presented to the Holland-Belgian Congress held at Ghent and Brussels in September, 1938.

Vol. 38. No. 10. October 1938.

A Review of Modern Conceptions of the Structure and Classification of Tumors Derived from the Medullary Epithelium. P. Bailey. 759.

*The Frequency of Gliomas having Variable Histological Structure H. J. Scherer. 783.

Recklinghausen's Neurofibromatosis Combined with True Syringomyelia. J. de Busscher, H. J. Scherer, and F. Thomas. 788.

On Complex Involuntary Movements Appearing Late Following the Resection of a Cerebellar Hemisphe : e. R. S. Dow and L. v. Bogaert. 803.

Gliomas having Variable Histological Structure.—An interesting paper dealing with the frequency of cell types seen in each of a 100 tumours when submitted to a systematic and detailed study. A combination of different glioma tissues were found in 40 and in 26 " benign " and " malignant " growth types were to be found. (E. A. C.)

JOURNAL OF CLINICAL INVESTIGATION

Vol. 17. No. 5. September 1938.

Calcium and Phosphorus Metabolism in Diseases of the Thyroparathyroid Apparatus. II. Calcium and Phosphorus Balance (A) Following Therapeutic Radiation of the Hyperplastic Thyroid Gland, and (B) in Hyperthyroidic Patients Treated with Iodine. F. S. Hansman and W. A. C. Fraser. 543.

Study of the Tendency to Edema Formation Associated with Incompetence of the Valves of the Communicating Veins of the Leg. Oxygen Tension of the Blood Contained in Varicose Veins. H. E. Holling, H. K. Beecher, and R. R. Linton. 555.

The Determination of the Cardiac Output in Man at Brief Intervals by a Modification of the Ethyl Iodide Method. J. C. Snyder. 563.

The Cardiac Output and Oxygen Consumption of Nine Surgical Patients before and after Operation. J. C. Snyder. 571.

Measurements of the Circulation in Constrictive Pericarditis before and after Resection of the Pericardium. H. J. Stewart, G. J. Heuer, J. E. Deitrick, N. F. Crane, R. F. Watson, and C. H. Wheeler. 581.

Renal Excretion at Low Urine Volumes and the Mechanism of Oliguria. L. C. Chesley. 591.

The Value of the Acid Test Meal : A Study of Normal Persons and of Persons with Duodenal Ulcer. C. S. Welch and M. W. Comfort. 599.

Placental Interchange. II. Comparison of the Total Base Concentration of the Fetal and Maternal Blood at Parturition. H. E. Thompson and W. T. Pommerenke. 609.

An Attempt to Increase Resistance to Pertussis in Newborn Infants by Immunizing their Mothers during Pregnancy. J. A. Lichty, B. Slavin, and W. L. Bradford. 613.

On the Permanence of Recovery in Acute Glomerulonephritis. E. N. Loeb, J. D. Lyttle, D. Seegal, and E. L. Jost. 623.

The Serum Antistreptolysin Titer in Acute Glomerulonephritis. J. D. Lyttle, D. Seegal, E. N. Loeb, and E. L. Jost. 631.

Experience with the Hamilton and Highman Test for Parathyroid Hyperfunction in Chronic Nephritis, Toxic Goiter, and Paget's Disease of Bone. D. R. Gilligan, M. C. Volk, and S. L. Gargill. 641.

The Choline-Esterase Activity of the Blood Serum in Disease. A. T. Milhorat. 649.

The Effect of Artificial Pneumothorax upon the Anoxemia of Pneumonia. D. Goldstein, M. Block, and M. Rosenblüth. 659.

Basal Gastric Secretion in Cases of Peptic Ulcer : Relation of Acidity to Healing of Ulcer. A. L. Bloomfield and L. R. French. 667.

Requirements for Vitamin C in Man. M. Heinemann. 671.

The Use of a Globulin Substance Derived from Beef Plasma as a Local Hemostatic in Hemophilia. F. J. Pohle and F. H. L. Taylor. 677.

The Control of Renal Blood Flow and Glomerular Filtration in Normal Man. H. Chasis, H. A. Ranges, W. Goldring, and H. W. Smith. 683.

JOURNAL OF COMPARATIVE NEUROLOGY

Vol. 69. No. 1. August 1938.

*The Structural Organization of the Celiac Ganglia. A. Kuntz. 1.
Development of the Brain of Amblystoma Punctatum from Early Swimming to Feeding Stages. C. J. Herrick. 13.
*Functional Localization in the Cerebellum of Primates. E. H. Botterell and J. F. Fulton.
i. Unilateral Section of the Peduncles. 31.
ii. Lesions of Midline Structures (vermis) and Deep Nuclei. 47.
iii. Lesions of Hemispheres (neocerebellum). 63.
Thalamus of a Dog without a Hemisphere Due to a Unilateral Congenital Hydrocephalus. J. W. Papez and R. W. Rundles. 89.
Thalamic Connections in a Hemidecorticate Dog. J. W. Papez. 103.
The Thalamic Nuclei of Sus Scrofa. O. Solnitzky. 121.

Structural Organization of Celiac Ganglia.—The connections of cells in the cœliac ganglia, as revealed by study of degeneration preparations, are numerous and very complex. (A. M. B.)

Functional Localization in Cerebellum of Primates.—The results of a very considerable number of experimental operations upon the cerebellum of macaques, baboons, and chimpanzees are reported, with the following main conclusions: (1) Simultaneous unilateral section of all three cerebellar peduncles is followed by conspicuous ipsilateral ataxia, tremor, and disturbances of gait. The equilibrium is disturbed. Ipsilateral hypotonia is only transient and is not very marked. Nystagmus does not persist for more than 24 hours in any animal wherein the vestibular nucleus is undamaged. (2) Complete longitudinal midline splitting of the cerebellum gives rise to serious enduring disturbances of equilibration unaccompanied by much tremor of the extremities. (3) Lesions involving the palaeocerebellum only (pyramis, uvula, nodulus, and fastigial nuclei) give rise to serious equilibratory disturbances with only slight tremor and ataxia of the extremities. (4) Enduring tremor of the extremities together with errors of range and direction of movement of the extremities, occurs when the globose and emboliform nuclei are extensively damaged. (5) Unilateral lesions restricted to neocerebellar cortex cause ipsilateral awkwardness of gait and volitional movement, with some hypotonia. Bilateral lesions increase the degree and duration of these defects. The effects are seen equally in upper and lower extremities. No evidence of functional localization within the hemispheres is found. (6) When neocerebellar cortical lesions are accompanied by damage of the dentate nuclei, all the above defects are more marked, and to them are added transient ataxia and tremor. (7) Very extensive functional recovery occurs after all manner of cerebellar lesions in those animal species investigated. (A. M. B.)

Vol. 69. No. 2. October 1938.

The Cerebral Cortex of the Cebus Monkey. G. von Bonin. 181.
The Telencephalon of Tupinambis Nigropunctatus. II. Corpus Striatum. A. O. Curwen. 229.
*The Blood Vascular System of the Hypophysis of Amblystoma Tigrinum. P. G. Roofe. 249.
The Efferent Fibres of the Thalamus of Macacus Rhesus. I. Lateral and Ventral Nuclei. R. L. Crouch and J. K. Thompson. 255.
The Ontogenetic Development and Phylogenetic Significance of the Cortex Telencephali in the Chick. H. Kuhlenbeck. 273.
The Ciliary Ganglion and Associated Structures in the Gecko, Gymnodactylus Kotschyi. L. T. Evans and J. Minckler. 303.
*Proprioceptive Components of Cranial Nerves. The Spinal Accessory Nerve. K. B. Corbin and F. Harrison. 315.
Reciprocal Connections of the Striatum and Pallidum in the Brain of Pithecus (Macacus) Rhesus. J. W. Papez. 329.

Blood Vascular System of Amblystoma Tigrinum.—In amblystoma there is no evidence of a hypophysio-portal venous system, such as was first described by Popa and Fielding in man. (A. M. B.)

Proprioceptive Components of Cranial Nerves.—Afferent proprioceptive impulses from the trapezius and sternomastoid muscles travel via the ventral roots of C1, C2, C3, C4, and C5 to their cells in the corresponding dorsal root ganglia. There is no evidence of sensory activity in that portion of the accessory nerve just external to the jugular foramen. These conclusions are chiefly based on the results of stimulation experiments with oscillographic recording. (A. M. B.)

JOURNAL OF MENTAL SCIENCE

Vol. 84. No. 352. September 1938

The Low-Rate Private Patient and Some Changes. J. R. Gilmour. 596.
*Disturbances of Somatic Functions in Catatonia with a Periodic Course, and their Compensation. R. Gjessing. 608.
Faulty Detoxication in Schizophrenia. J. H. Quastel and W. T. H. Wales. 622.
*The Influence of Pharmacological Shocks on the Psychoses. M. Sakel. 626.
*Observations on Convulsion Therapy with Triazol 156. A. Walk and W. Mayer-Gross. 637.
The Range of Mental Reaction States Influenced by Cardiazol Convulsions. L. C. Cook. 664
Psychological Aspects of Insulin Shock Therapy: A Psychosomatic Study. E. Larkin. 668.
Insulin and Cardiazol: Experiences of the Combined Method. L. W. Russell. 672.
Cardiac Complications in Cardiazol Treatment:

Observations in Four Cases. A. Dick and W. McAdam. 677.
Dangers and Emergencies of Insulin Therapy of the Psychoses. L. A. Finiefs. 678.
Some Genetical Problems in Mental Deficiency. L. S. Penrose. 693.
Consanguinity and Mental Disorder. T. A. Munro. 708.
The Technique and Complications of Insulin Therapy S. W. Gillman. 718.
*Cardiazol Treatment of Schizophrenia. A. Harris. 735.
Neurological Manifestations Seen During Cardiazol and Insulin Treatments. D. Blair. 776.
*The Electro-Encephalogram in Schizophrenia. J. F. MacMahon and W. G. Walter. 781.
Some Observations on Vitamin-C Deficiency in Acute Mental Disorder. F. T. Thorpe. 788.
Home-Sickness and Immigrant Psychoses. Austrian and German Domestic Servants the Basis of Study. I. Frost. 801.

Somatic Functions in Catatonia.—In patients with catatonic psychoses a nitrogen balance sheet is constructed. As a preliminary it is important to eliminate local sepsis. The essential metabolic change in periodic catatonia is periodic variation in nitrogen balance with alternating phases of retention and over-excretion. Stupor or excitement can begin at the beginning or the end of the negative phase of nitrogen balance. This psychosis is benefited by treatment with thyroid extract, given in a dose just sufficient to prevent nitrogen retention. (A. M. B.)

Pharmacological Shocks. — Dementia præcox, no matter of what duration or type, receives benefit from treatment by insulin. The results of treatment with insulin are much better than the results obtained from cardiazol alone. (A. M. B.)

Convulsion Therapy with Triazol 156.—In the treatment of dementia præcox triazol 156 has many advantages over cardiazol, notably in ease of administration. It is probably equally effective. (A. M. B.)

Cardiazol Treatment of Schizophrenia.—When critically examined the percentage of recovery in a group of schizophrenic patients treated with tetrazol according to Meduna's method does not appear significantly higher than in a control untreated group. There is some evidence that the treatment hastens remissions when these are on the way, and shortens psychotic episodes. (A. M. B.)

Electro-Encephalogram in Schizophrenia.—The electro-encephalograms of 30 schizophrenic patients have been studied. Eye movements and refusals to co-operate introduce certain difficulties and defects into the records. A certain number of the patients displayed a delta discharge; this was most marked over the frontal lobes of the more stuporose cases. This delta discharge vanished in two cases undergoing cardiazol therapy and in one case of spontaneous remission. (A. M. B.)

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Diagnosis and Prognosis in Psychiatry: With a Follow-Up Study of the Results of Short-Term General Hospital Therapy of Psychiatric Cases. J. H. Masserman and H. T. Carmichael. 893.
*Studies on the Brain Phosphatases. H. H. Fleischhacker. 947.
Observations on Two Hundred Dartmoor Convicts. J. J. Landers. 960.
*The Iron Content of the Human Brain. A. H. Tingey. 980.
Psychotherapy and Psychoses Associated with Alcohol. L. Minski. 985.
Medinal-Luminal Prolonged Narcosis. R. S. Wilson and S. W. Gillman. 991.
*Agenesis of the Corpus Callosum. J. S. Lloyd and J. N. Jacobson. 995.
Cardiac Complications in Cardiazol Treatments: Observations on Four Cases. A. Dick and W. McAdam. 999.
*On the Mechanism of the Cardiazol Convulsion. J. A. F. Denyssen and D. J. Watterson. 1,002.
Methods of Estimating Intelligence and Personality and their Applications. (General Review.) J. M. Blackburn. 1,009.

Brain Phosphatases.—Histochemical and biochemical methods for the estimation of phosphatase in nervous tissue are described. The alkaline phosphatase is firmly united with the tissue. The phosphatase activity of three different regions of grey matter varied directly with P_H. (A. M. B.)

Iron Content of Human Brain.—The content of various forms of iron in different parts of the human brain is recorded, and some values from cases of G.P.I. are included. About 70 per cent. of the iron in cortex and white matter in each situation is "protein iron," though their percentage content of protein is 47 and 27 respectively. (A. M. B.)

Agenesis of Corpus Callosum.—In the case of a micro-cephalic, quadriplegic idiot with double optic atrophy, a large fibroma of the left cardiac ventricle and agenesis of the corpus callosum are described. (A. M. B.)

Mechanism of Cardiazol Convulsion.—Amyl nitrite, sodium nitrite, and histamine can prevent the occurrence of cardiazol convulsions. The conclusion is drawn that the mechanism underlying cardiazol convulsions is one of sudden vasoconstriction. (A. M. B.)

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Vol. 88. No. 1. July 1938.

Concrete Model and Abstract Copy: A Psychobiological Interpretation of the "Closing-In" Symptom of Mayer-Gross. W. Muncie. 1.
The Phenomenon of Transference in a Case of Phobia. F. Wittels. 12.
The Clinical Syndromes of Echolalia, Echopraxia, Grasping and Sucking. D. E. Schneider. 18.

Use of Histamine Phosphate and Peptone Solution in the Treatment of Neuroses and Psychoses. W. Marshall and J. S. Tarwater. 36.
*Multiple Sclerosis. G. Steiner. 42.

Multiple Sclerosis.—This article deals with the etiological significance of the regional and occupational incidence. The author evidently favours an infectious origin. He discusses familial cases and also cases of apparent conjugal multiple sclerosis. No pathological examination of these cases is described. (E. A. C.)

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Psychotherapy and Psychiatry. H. Flournoy. 141.
Studies in Equilibrium Reaction. S. Weisz. 150.
*A Study of Fifty Cases of Bromide Psychosis. F. J. Curran. 163.
Cerebellar Coma. A. Gordon. 193.
The Clinical Syndromes of Echolalia, Echopraxia, Grasping and Sucking. (Concluded.) D. E. Schneider. 200.

Bromide Psychosis.—The author reports 50 cases of which 70 per cent. were women ; 33 patients had delirium and one marked hallucinosis. Treatment consists in stopping the bromide, giving chlorides by mouth and forcing fluids. (E. A. C.)

Vol. 88. No. 3. September 1938.

The Abortion of Recurrent Depressive Psychoses. L. B. Holman. 273.
Some Clinical Neurological Findings in Epilepsy. S. M. Weingrow, T. Fitch, and A. W. Pigott. 281.
Indices of Body Build, Their Relation to Personality. S. H. Kraines. 309.
Neuronotis of the Cranial Nerves. A. T. Steegmann. 316.
Some Uses of Diallylmalonyurea in Psychiatry. G. D. Woodward. 324.
Blindness Passed Unobserved for Many Years. W. S. Bab. 327.
*Prostigmin in Myasthenia Gravis. M. Tarlau. 330.

Prostigmin in Myasthenia Gravis.—Two cases reacted well at first to prostigmin therapy. In one case tolerance to the drug developed rapidly and the patient died. (E. A. C.)

Vol. 88. No. 4. October 1938.

Psychological Considerations of the Insulin Treatment in Schizophrenia. L. L. Orenstein and P. Schilder. 397.
Morbid Hunger in Relation to Narcolepsy and Epilepsy. M. Levin. 414.
The Relationship of Polydipsia and Polyuria in Diabetes Insipidus. R. Y. Bellows and W. P. Vanwagenen. 417.
Present Day Research Trends in the Field of Human Deficiency. E. J. Humphreys. 474.
Sounds in Language. T. K. Davis. 491.
The Treatment of Epilepsy with a Synergistic Combination of Phenobarbital and Belladonna. A. E. Loscalzo. 500.

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Olivo-Ponto-Cerebellar Atrophy and Unilateral Involvement of Cranial Nerve Nuclei. C. Davison and I. S. Wechsler. 569.
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Pathology of Huntington's Chorea. T. T. Stone and E. I. Falstein. 602.
Psychomatic Relationships in Pruriginous Lesions. H. Kelman and H. Field. 627.
Psychological Considerations of the Insulin Treatment in Schizophrenia. (Concluded.) L. L. Orenstein and P. Schilder. 644.

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Experimental Data on the Architectonics of the Peripheral Nerves. B. A. Favorsky. 5.
The Ultra-High Frequency in the Clinic of Nervous Diseases. V. A. Milizin. 17.
The Psychomotor Co-ordination in Perception of the Rate of Movement in Various Psychic Conditions. V. A. Gorovoi-Shaltan. 26.
Certain Clinical-Anatomical Correlations in the Concept of the Ascending Landry Paralysis. E. V. Schepkovskaya. 39.
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The Malarial Polyneuritis. S. G. Petrovsky. 58.
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The Electrophysical Properties of the Spinal Fluid in Some Pathologic Processes of the Central Nervous System. E. A. Selkov and J. E. Baligin. 70.
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An Analysis of the Relation of the Motive Synergy in Act of Fixation of the Glance upon Vision at Short Distance. V. G. Labadze. 81.
The Clinic and Symptomatology of the Hepato-lenticular Degeneration. O. A. Hodkarian. 90.
The Osseous-Trophical Changes in Hemiplegias of Vascular Origin. A. M. Rosenzweig and L. V. Dervisye. 97.
Nerodynamic Cutaneous Vascular Changes in Trauma. V. P. Kusnezov. 106.
Of the Formulation of the Paragraphs 16 and 15 of Now Existing Lists of Occupational Diseases. A. M. Veger. 109.
The Gyllen Allajuanin Reflex. V. A. Bakhtiarov. 115.
The Treatment of the Peripheral Diseases of the Nervous System by Inotophoresis of Novocaine. N. N. Mikhailova and V. N. Popova. 122.
The Treatment of Epilepsy with Cream of Tartar plus Luminal. J. S. Veinberg. 126.

On the Topical Diagnosis of Vascular Diseases of Medulla Oblongata. M.J. Scherechevskaya. 132.
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Acute Encephalitis and Encephalo-Myelitis. The Dynamic of the Morbidity and Clinic of Encephalitis in Aizerbaidjan. M. M. Ammosov. 3.
The Intermittent Form of Myoclonus Epilepsy. S. N. Davidenkov, L. J. Larina and T. S. Malisheva. 22.
The Repercussive Effect of Ultra-Violet Erythem-Therapy in Ishias. A. J. Firson, A. G. Genkina, and R. A. Krasnoperka. 27.
Rupture of Vessels—the Pathologic Basis of Traumatic Lesions of the Brain. B. J. Sharapov. 34.
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The Visceral Nervous System and Pain. A. M. Greenstein. 3.
The Course and Outcome of Exogenous Psychosis. I. G. Ravkin. 18.
The Structure and Dynamics of Schizophrenic Mentality in Defective States. A. I. Molochek. 30.
The Rhythm and Amplitude of the Action Currents and the Protracted Stable Potential in Volitional Muscle Contractures in Man. V. S. Roosinov and S. A. Choogunov. 45.
The Morphological Variability of the Lower Parietal Area. J. G. Shevchenko. 53.
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The Morphological Blood Changes Associated with Encephalography in Organic Diseases of Early Childhood. M. J. Turetzky. 96.
The Functional Condition of the Hemato-Encephalitic Barrier in Chronic Diseases of the Central Nervous System in Early Childhood. Report V. The Hemato-Encephalitic Barrier with Regard to Bromides in Epilepsy of Children. R. A. Veiss, M. M. Model, and M. J. Turetzky. 105.
An Evolution of the Novocaine Therapy Method in Combined Treatment of the Peripheral Diseases of the Nervous System. A. H. Teregulov. 110 .
Some Experience with Employment of Intracutaneous Injections and Iontophoresis of Novocaine in Diseases of the Nervous System. V. A. Tumskoi, T. S. Leibovitch, N. N. Mikhailova, and V. N. Popova. 115.
The Shifting of Electro-Excitability of the Motor Nerves Influence of Indifferent Baths. I. E. Landsman. 122.
The Clinic of Neuro-Brucellosis. (According to Records of the Kuibyshev Clinical Hospital and Gai Health-Resort of the Orenburg District.) M. A. Mostvilishker. 128.
Report of the Brigade from the Viem Clinic for Nervous Diseases on the Acute Mass Illness in December, 1937, at N. L. I. Alexandrova, J. S. Sergeva, and E. A. Fedorova. 133.
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Potential Records from the Optic Cortex of the Cat. G. H. Bishop and J. O'Leary. 391.
A Sensory Cortical Representation of the Vagus Nerve. P. Bailey and F. Bremer. 405.
Distribution of Disturbance-Patterns in the Human Electroencephalogram, with Special Reference to Sleep. A. L. Loomis, E. N. Harvey, and G. A. Hobart. 413.
The Fright Reaction after Section of the Facial, Trigeminal, and Cervical Sympathetic Nerves. M. B. Bender and M. A. Kennard. 431.
Functional Organization in the Face-Subdivision of the Sensory Cortex of the Monkey. (Macacca Mulatta.) J. G. D. de Barenne, W. S. McCulloch, and T. Ogawa. 436.
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Postural Neck Reflexes in the Labyrinthectomized Monkey and Their Effect on the Grasp Reflex. J. F. Fulton and R. S. Dow. 455.
The Influence of Posture on Responses Elicitable from the Cortex Cerebri of Cats. J. W. Ward. 463.

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Degenerative Changes in the Axis Cylinders of the Dental Nerves, Due to Diets Deficient in Vitamin A and Carotene. J. D. King, W. Lewinsky, and D. Stewart. 206.
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The Dependence of the Activity of the "Apneustic Centre" on the Carbon Dioxide of the Arterial Blood. G. Stella. 263.
A Micro Blood Volume Method Using a Blue Dye and Photocell. J. A. Kennedy and G. A. Millikan. 276.
Neuro-Muscular Conduction in the Fowl. G. L. Brown and A. M. Harvey. 285.
A Plethysmographic Method for Measuring Systolic Blood Pressure in the Intact Rat. F. B. Byrom and C. Wilson. 301.

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The Relation of Contracture to the Increment in the Resting Heat Production of Muscle under the Influence of Potassium. C. G. Smith and D. Y. Solandt. 305.
*Synchronized Impulse Discharges from Receptors in the Deep Tissues in Response to a Vibrating Stimulus. F. Echlin and A. Fessard. 312.
On the Absorption of Ultra-Violet Radiation by Human Sweat. W. H. Crew and C. H. Whittle. 335.
The Phase Angle of Normal Human Skin. A. Barnett. 349.
A Study of the Source of Liver Fat Using Deuterium as an Indicator. H. M. Barrett, C. H. Best, and J. H. Ridout. 367.
On the Accuracy of the Thermostromuhr Method for Measuring Blood Flow. H. Barcroft and W. M. Loughridge. 382.
Experiments on the Relation Between the Thyroid Gland and Lactation in the Rat. S. J. Folley. 401.
Maximum Growth Rate of Capon Comb. C. W. Emmens. 413.
Some Effects of Compounds of the Androsterone-testosterona Series on Ovariectomized Mice. C. W. Emmens. 416.
*The Effect of the Subarachnoid Administration of Histamine on the Rate of Absorption of Isotonic Saline Solution in the Dog. T. H. B. Bedford. 423.
*The Effect of Hypertonic Solutions on Gastric Secretion and Intraocular Pressure. R. L. Noble and J. D. Robertson. 430.

Response to a Vibrating Stimulus.—Cats, rabbits, and frogs were used and nerve impulse discharges were recorded by Dubois' oscillograph. Tuning forks of frequencies from 85 to 530 vibrations per second were used. It was found that the vibration of a tuning fork will stimulate the "stretch" receptors in muscle and tendon when the base of the fork is applied to a bone. It is suggested that the synchronized discharges from "stretch" receptors may be responsible for vibratory sensibility. (E. A. C.)

Subarachnoid Histamine.—The author found that subarachnoid infusion of histamine in solution had no effect on absorption of tyrode solution from the subarachnoid space. He believes that this result indicates that menigmus does not result from the escape of histamine into the subarachnoid space. (E. A. C.)

Intraocular Pressure.—By studying blood pressure, intraocular pressure, gastric secretion and hæmoglobin concentration following the administration of 30 per cent. NaCl, the authors found that the intraocular pressure continued to fall while the body tissues were taking up water following the dehydration by the hypertonic solution. It was found that the gastric secretion also diminished and remained low during this period. They conclude therefore that the aqueous humour is not a dialysate, but is the product of a secretory process. (E. A. C.)

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Properties of Tonic Contractions Produced by Electrical Stimulation of the Anterior Retractor of the Byssus of Mytilus Edulis. I. Singh. 1.
Factors in Sexual-Skin Œdema. O. E. Aykroyd and S. Zuckerman. 13.
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on the Weights of the Testes' Accessory Reproductive Organs and Endocrine Glands of Young Male Guinea-Pigs. A. C. Bottomley and S. J. Folley. 26.
The Influence of the Glycotropic (Anti-Insulin) Factor of the Anterior Hypophysis on the Insulin Sensitivity of the Hypophysectomized Rabbit. W. H. Newton and F. G. Young. 40.
Undernutrition and Liver Fat. C. H. Best and J. H. Ridout. 47.
The Electrical Activity of the Cerebellum and Its Functional Significance. R. S. Dow. 67.
The Action of Ephedrine. J. H. Gaddum and H. Kwiatkowski. 87.
Reactions of Avian Muscle to Acetylcholine and Eserine. G. L. Brown and A. M. Harvey. 101.
*The Chloride Content of Blood Serum and Aqueous Humour. Its Relation to Glaucoma and to the Formation of Intra-Ocular Fluid. T. H. Hodgson. 118.
Water Balance and Blood Changes Following Posterior Pituitary Extract Administration. E. C. Dodds, S. H. Liu, and R. L. Noble. 124.
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The Absorption and Excretion of Iron Following Oral and Intravenous Administration. R. A. McCance and E. M. Widdowson. 148.
Liberation of Acetylcholine by the Perfused Superior Cervical Ganglion. F. C. MacIntosh. 155.
The Rate of Adaption of Cutaneous Nerve Endings in the Frog. F. T. Dun and C. B. Finley. 170.
Functional Impairment of the Anterior Pituitary Gland Produced by the Synthetic Œstrogenic Substance 4 : 4′ Dihydroxy-x : β-Diethylstilbene. R. L. Noble. 177.
*Nissl Granules in " Fatigued " Nerve Cells. E. M. Scarborough. 184.

Chloride Content of Blood Serum and Aqueous Humour.—From a series of investigations in man and in dogs it was found that the chloride ion in the aqueous humour is higher than in serum. The difference between glaucomatous and non-glaucomatous humours is negligible. The aqueous humour is not regarded as a dialysate. (E. A. C.)

Nissl Granules in Nerve Cells.—Following prolonged stimulation no change in the appearance of the Nissl granules of automatic ganglia was found though " fatigue " had got in. (E. A. C.)

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Liberation of Histamine and Formation of Lysocithin-Like Substances by Cobra Venon. W. Feldberg and C. H. Kellaway. 187.
A New Arrangement for the Registration of Diaphragm Movements. R. Meier and R. Müller. 227.
The Formation of Lysocithin and of a Muscle-Stimulating Substance by Snake Venoms. W. Feldberg, H. F. Holden, and C. H. Kellaway. 232.
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*A Study of the Oral (Orbicularis Oris) Reflex. N. S. Schlezinger. 629.
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*The Prognostic Possibilities of the Rorschach Method in Insulin Treatment. Z. Piotrowski. 679.
*Neurological Observations in Hypoglycemic States. P. Hoch. 690.
*Subjective Experiences in Patients Incident to Insulin and Metrazol Therapy. H. A. Starks. 699.
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*Occurrence of Relapses in Patients Treated with Insulin Hypoglycemic Shock. W. A. Horwitz, J. R. Blalock, and M. M. Harris. 716.
Electrocardiographic Studies of Patients Receiving Convulsant Doses of Metrazol in the Treatment of Schizophrenia. M. Pellens. 722.
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Psychological Performance Tests as Prognostic Agents for the Efficacy of Insulin Therapy in Schizophrenia. M. M. Bolles, G. P. Rosen, and C. Landis. 733.
*The Use of Intravenous Sodium Amytal in Psychogenic Amnesic States. M. Herman. 738.
*Testosterone in Male Involutional Melancholia. H. S. Barahal. 743.
Uronic Acids in Schizophrenia and Epilepsy. C. N. Baganz. 750.
Control of Tuberculosis in the Hudson River State Hospital. A. A. Leonidoff. 754.
*Water Intoxication in a Mental Case. H. S. Barahal. 767.
Studies in Obsessive Ruminative Tension States. L. F. Woolley. 772.

Study of Oral Reflex.—The oral reflex consists of a contracture of the orbicularis oris muscle in response to percussion of the lips. The centre of the lips is the most excitable area. The excitability diminishes progressively from the centre. The oral reflex was studied in a control series of 16 children and 79 healthy adults of all ages. During infancy the incidence of the oral reflex was found to be low and then increased gradually till it reached at a constant level of about 59·5 per cent. in adult life. The mean intensity of the response showed an increase proportionate to the increase in age. The incidence and intensity are increased in psychotics and noticeably in dementia præcox and paralysis agitans.

Rorschach Method in Insulin Treatment.—Schizophrenics who were treated by insulin were investigated by the Rorschach test. A study of the results before treatment had commenced was made in 25 cases. The much improved patients had personalities functioning at a higher intellectual level than did unimproved patients after insulin treatment. Many Rorschach records in the unimproved group resembled records obtained in the cases of organic brain diseases. The improved, much improved, and recovered cases possessed more of the typical schizophrenic characteristics especially with regard to the great unevenness of performance level and the conspicuous absence of interpretations. It was found possible to differentiate between two types of intellectual confusion pointing to a better prognosis, one which is characterized by a rather accurate visual perception of the ink-blot and by a rather fantastic elaboration of these perceptions, and the other type which appears to justify a rather bad prognosis is marked not only by a rather absurd elaboration of the perceptual material, but also by very vague perceptions.

Neurological Observations in Hypoglycæmic States.—The skin reflexes are the first to disappear in insulin coma; particularly the abdominals. The deep reflexes follow but in varied individual order. The extensor response is present in all stages of coma except rarely in deep stupour. Forced grasping is sometimes seen in the hypoglycæmic state and generally appears when the patient is in the initial state of superficial coma. Nearly all the cases show hypertonia and even spasticity. Incomplete pictures of decerebrate rigidity are occasionally observed. Fragmentary decerebrate rigidity such as over-pronation or equino varus are common. Tonic neck reflexes have been occasionally elicited. Patients recovering from coma show an infantile form of rising reaction and positive and negative supporting reactions are frequently seen. Athetochoreiform movements are often released or modified by an external sensory stimulus. Forced crying and laughing without emotional concommitants are observed. Dysasthenia and dyspraxia may occur similar to that seen in pseudobulbar paralysis.

Subjective Experiences in Insulin and Metrazol Therapy.—Insulin patients have no memory of a fear reaction. Metrazol patients find the treatment unpleasant and one-fourth of them admitted to a fear of death in connection with the injections.

Relapses in Patients Treated with Insulin Hypoglycæmic Shock.—Relapses occur in a considerable percentage of insulin remissions, 8 out of 31 or 25 per cent. When relapsed patients are treated again the majority show favourable responses. No criteria are available as to the type of patient who will relapse.

Intravenous Sodium Amytal in Psychogenic Amnesic States.—Three cases are reported in which negativistic psychogenic amnesic states were abolished by intravenous injections of seven grains of Sodium Amytal.

Testosterone in Male Involutional Melancholia.—Five cases of male involutional melancholia were treated for three to four months with testosterone-proprionate with no noticeable improvement in their mental condition and only one showed a physiological sexual response.

Water Intoxication.—A case of water intoxication is reported in which a dementia præcox patient drank excessive quantities of tap water, resulting in œdema, coma, convulsions, and subsequent recovery.

REVISTA ARGENTINA DE NEUROLOGIA Y PSIQUIATRIA

Vol. 3. No. 1. March 1938.

Las Poli-Radiculo-Ganglio-Neuritis Generalizadas. Consideraciones sobre 14 Casos Observados y Examen Histo-Patológico en 3 de Ellos. (Polyradiculo-ganglio neuritis. Studies of 14 cases with 3 examined histologically.) T. Fracassi, D. E. Garcia, and A. C. Decoud. 5.

Tratamiento de los Esquizofrenia por el Método de Sakel (Insulinoteripia). (Insulin therapy of schizophrenia.) A. P. Quaranta. 31.

Importancia de los Síntomas Simpáticos Frustos en el Diagnóstico de Costilla Cervical. (Importance of concealed sympathetic signs in cervical rib.) T. Fracassi. 83.

El Choc Insulinico en el Tratamiento de los Estados Obsesivos. (Insulin shock in the treatment of obsessive states.) C. Lambruschini. 94.

Tratamiento de la Poliomielitis Anterior Aguda en el Periodo de Regresion de las Parálisis. (Treatment of acute anterior poliomyelitis in the period of regressional paralysis.) O. R. Marottoli. 96.

Etilista Crónico Tratado por la Sugestión Hipnótica y la Reeducación Psiquica de su Personalidad. I. Cotlier. 102.

Vol. 3. No. 2. June 1938.

Profesor Doctor Jorge Marinesco. (Professor Georges Marinesco. 139.
Onanismo Infantil. (Infantile masturbation.) A. Gareiso and A. J. Petre. 142.
Las Mioclonias Velvo-Faringeo-Oculo-Diafragmáticas. A Propósito de Tres Casos Clinicos. (An account of three cases of palatal nystagmus.) T. Fracassi and R. Graziano. 152.
Sobre los Trastornos Fisiópáticos en Neurologia de Guerra. G. Berman. 164.
Telagiectasias o Angiomas Simples del Neuro-eje. (Telangiectases and angiomas of the centra nervous system.) T. Fracassi, D. E. Garcia, and A. C. Decoud. 173.
Anemia Perniciosa. Sindrome Confusional. (Confusional states in pernicious anæmia.) A. P. Quaranta. 183.
Traumatismo Craneal y Torticolis Psicógeno. (Head injury and psychogenic torticollis.) C. Lambruschini. 187.
Tic Clónico de los Globos Oculares y de los Párpados. (Clonic tic of the eyeballs and lids.) I. Cotlier. 200.

REVUE NEUROLOGIQUE

Vol. 70. No. 2. August 1938.

La Méningite à Torula. (Torula's meningitis.) J. de Busscher, H. J. Scherer, and F. Thomas. 149.
Un Cas de Rage Humaine. (A case of hydrophobia in a human.) J. Tinel. 169.
Epilepsie Réflexe. (Reflex epilepsy.) V. Pitha. 178.

Vol. 70. No. 3. September 1938.

Descartes et l'Anatomo-Physiologie du Système Nerveux. (Descartes and the anatomo-physiology of the nervous system.) A. Souques. 221.
Sur un Cas de Paralysie Pseudobulbaire avec " Syndrome Catatonique " chez un Hypertendu Jeune. (A case of pseudobulbar paralysis with " catatonic syndrome.") R. Strauss. 246.
De la Séminologie des Olives Bulbaires. (The seminology of the bulbar olives.) N. Zand. 258.

Vol. 70. No. 4. October 1938.

*Réflexions à Propos d'un Cas de Myoclonies Vélo-Palatines Consécutives à une Lésion Cérébelleuse Droite avec Hypertrophie des Cellules Nerveuses de l'Olive Bulbaire Gauche. (Considerations of a case of palatal myoclonus following a right cerebellar lesion with hypertrophy of the nerve cells of the left bulbar olive.) J. Nicolesco, O. Sager, and T. Hornet. 301.
Accès Cataplectiques Sous-Corticaux. (Cataplectic sub-cortical approach.) J. Rothfeld. 317.
Nature Neuro-Humorale de l'Épilepsie. (The neuro-humoral nature of epilepsy.) N. I. Propper. 332.

Palatal Myoclonus.—Another case of palatal myoclonus with a pathological report is recorded. The lesion situated in the cerebellum is suggested as the possible cause of the hypertrophy of the olive. (E. A. C.)

RIVISTA DI NEUROLOGIA (NAPOLI)

Vol. 11. No. 4. August 1938.

*Sindromi Neurologiche da Neurofibromatosi di Recklinghausen. (Neurological syndrome of Recklinghausen's fibromatosis.) F. Vizioli and S. Tolone. 281.
*Tumore Multiplo Cerebræl. Glioblastoma del Ponte e del Corpo Calloso Senza Sintomatologia Psichica. (Multiple cerebral glioblastomata of the pons and of the corpus callosum.) D. Alessi. 321.
*La Scoliosi Spasmodica nella Diagnosi Differenziale fra Lombo Ischialgie Sintomatiche di Compressione della Coda Equina e Lombo Ischialgie Protratte Idiopatiche. (Spasmodic scoliosis in the differential diagnosis between lumbar pain symptomatic of compression of the cauda equina and protracted idiopathic lumbar pain.) C. Masci. 340.
*Sulle Paralisi Motorie da Herpes Zoster. (On motor paralysis in herpes zoster.) F. Rocchi. 368.

Recklinghausen's Neurofibromatosis.—Four cases of Recklinghausen's disease with marked peripheral and central neurological complications are described. The first showed symptoms referable to the cervical enlargement due to a central neoplasm probably with cavity formation, thus resembling a syringomyelia. The second showed a sacromatous transformation of a nodule in the right lateral cervical region and cerebral symptoms due to multiple neurofibromata in the posterior cranial fossa. The third showed signs of a progressive nervous disease comparable to a poliomyelitis or polyneuritis. In addition there were signs of high spinal (cervical) compression from an extramedullary tumour at a point corresponding to the last right cervical root. In the fourth case besides a spastic paraplegia resulting from a progressive traumatic spinal lesion, there was a complete flaccid paralysis of the left arm from compression of the plexus by the development of an enormous fibro-sarcoma in the axilla. This patient also exhibited an obvious if not gross acromegaly. The author discusses the clinical pathological and pathogenetic feature of the cases. (R. G. G.)

Multiple Cerebral Glioblastomata.—A pathological and clinical study of a multiple glioblastoma of the corpus callosum. The author does not think that the tumour formation can be explained on the grounds of metastases but of antochthonous growth

of tumours in several localities. Clinically a ponto-cerebellar tumour was diagnosed because the absence of any symptoms pointing to the corpus callosum had negatived the suggestion of a multiple tumour. There were no signs of apraxia or psychical alterations although the tumour extended anteriorly and mesially. Careful review of the history shows features which in the light of subsequent knowledge might have been attributable to the callosum but were not sufficient to permit of a diagnosis *in vivo*. (R. G. G.)

Spasmodic Scoliosis.—As a result of the study of a large number of cases the author establishes the rarity of scoliosis in compression of the cauda equina and its common occurrence in protracted idiopathic lumbar pain. This sign is therefore useful in differential diagnosis. As a result of his investigations into the behaviour of the vertebræ in the two forms in relation to the pathogenesis of sciatic scoliosis he reaches the following conclusions. The idiopathic forms should be regarded as manifestations of lumbar arthritis with accompanying neuralgia. This agrees with certain recent work of Putti. The resultant scoliosis then should be interpreted as the consequence of contractures and asymmetrical and partial immobilization of the column consequent upon partial and asymmetrical arthritic lesions. The pathological reason for a vertebral rigidity in the mid line which is characteristic of pressure on the cauda equina is to be found in the condition of the endovertebral spaces which demands that there should be a complete immobility of the vertebral column avoiding strain and movement of the roots. Hence the symmetrical bilateral contracture of the muscles. (R. G. G.)

Motor Paralysis in Herpes Zoster.—Two cases of motor paralysis in Herpes Zoster are described, one of the abdominal wall—not easily diagnosed—and the other of the face. The various aspects of this condition are discussed and the author points out that when this virus affects cells of the anterior horn it behaves as do other neurotropic viruses, picking out certain groups of cells. (R. G. G.)

RIVISTA DI PATOLOGIA NERVOSA E MENTALE

Vol. 51. No. 3. 1938.

*Il Comportamento del Reticolo Neurofibrillare Endocellulare di Donaggio nella Intossicazione Sperimentale da Tiroide Secca. (The behaviour of the neurofibrillary network of Donaggio in experimental poisoning by thyroid extract.) G. Oggioni. 359.

Il Metabolismo Basale nei Tumori Cerebrali. (Basal metabolism in cerebral tumours.) C. Ambrosetto. 379.

*Richerche Cronassimetriche e Reazioni Elettriche Neuromuscolari negli Schizofrenici durante l'Insulinterapia. (An examination of the chronaxia and neuromuscular electrical reactions in schizophrenics during insulin therapy.) A. Massazza. 402.

*Il Meccanismo d'Azione della Cura Insulinica. I Gludidi del Sistema Nervoso Centrale. (Sugars in the central nervous system.) A. Massazza. 408.

L'Anestesia Intradermica e Percutanea nel Trattamento di alcune Algie Periferiche. (Intradermic and percutaneous anæsthesia in the treatment of some peripheral pains.) C. Pero. 417.

*Sulla Meningite Luetica Acuta. (On acute syphilitic meningitis.) C. Trabucchi. 439.

*E Variato il Quadro Istopatologico della Paralisi Progressiva ? (Is the histopathological picture of progressive paralysis variable ?) F. Cardona. 467.

*Epicrisi Anatomo-Clinica di un Caso di Meningite Linfocitarua ad Etiopatogenesi Ignota (Anafilattica). (Anatomical-clinical description of a lymphocyte meningitis of unknown pathogenesis (anaphylactic). R. Martinetti and O. Carere-Comes. 475.

Gli Esiti Paralisi Progressiva Curate con la Malaria. Statistica dell'Istituto Psichiatrico di Firenze. (The results of progressive paralysis treated with malaria in the psychiatric institute of Florence.) G. Taddei. 503.

Paralisi Progressiva Insorta in Quattro Soggetti che Contrassero Contemporaneamente la Sifilide de una Stessa Fonte di Contagio. (Progressive paralysis occurring in four subjects who contracted syphilis contemporaneously from the same source.) G. Taddei. 524.

Experimental Poisoning by Thyroid Extract.—As a result of adding thyroid extract to the food of guineapigs and rabbits they died in about 20 days presenting diffuse congestive phenomena in the neuraxis but without showing any modification of the nerve net demonstrated by Donaggio's method, in accordance with the law of resistance formulated by Donaggio himself. (R. G. G.)

Chronaxia and Neuromuscular Electrical Reactions in Schizophrenics.—During the first period the muscles are in a state of hyper-excitability while in the second period they are in a condition of hypoexcitability almost simulating that of myasthenia. (R. G. G.)

Sugars in Central Nervous System.—During the first stages of insulin treatment the sugars tend to increase in the central nervous system even though profound coma is produced. Only after several treatments are the sugars reduced to a degree comparable to what happens in other organs. (R. G. G.)

Acute Syphilitic Meningitis.—A case in which the symptoms disappeared and serological reactions were restored to normal very rapidly by the intrathecal injection of sodium bismuth tartrata in an oily suspension. (R. G. G.)

Progressive Paralysis.—The author seeks to demonstrate that just as in recent years the clinical symptoms and course of progressive paralysis have been milder, so the histopathology presents a different picture

of less intensity and seriousness of the cerebral lesions. (R. G. G.)

Lymphocyte Meningitis.—A case of Lymphocyte meningitis complicated by hydrocephalus showed an apparently primary chronic ventricular ependymitis. The author considers that this was anallergic or hyperergic manifestation from an echinococcal cyst present in the liver. (R. G. G.)

Vol. 52. No. 1. July–August 1938.

*Spasmo di Torsione con Atetosi. (Torsion spasms with athetosis.) P. E. Maspes and A. Romero. 1.
Sul Problema delle Allucinazioni. (On the problem of hallucinations.) A. Romero. 17.
Il Rapporto delle Sieroreazioni di Takata e di Weltmann con i Fattori Patogenetici della Schizofrenia. (The agreement of the sere-reactions of Takata and Weltmann with the pathogenic factors of schizophrenia.) A. Zalla. 66.
*Tubercoli Multipli Encefalici. (Multiple tubercles in the brain.) A. Romero. 81.
Interpretazione Patogenetica del Dolore Occipito-Nucale e della Rigidita Nucale in Alcune Affezioni Meningo-Encefaliche e Sinusali. (Pathogenic interpretation of occipito-cervical pain and of cervical rigidity in some meningo-encephalitic and sinus affections.) C. Pero. 100.
*Sull'Uso della Centrifugazione nelle Reazioni dell'Oro Colloidale di Lange e del Mastica. (On the use of the centrifuge in the Lange reaction and the mastix reaction.) R. Bozzi. 128.
*Configurazione dell'Oligodendroglia Interfascicolare e sua Omologia Colla Cellula dello Schwann. (The appearance of the interfascicular oligodendroglia and their homology with the cells of Schwann.) F. Loretti. 135.
Interruzione del Sinergismo dei Movimenti Occulari durante il Coma Insulinico ? (Interruption of the Synergy of ocular movement during insulin coma.) G. Curti. 171.

Torsion Spasm with Athetosis.—The authors have carried out clinical and pathological studies of a case of torsion spasm with athetosis, and illustrated it with many photographs. They found, bilateral atrophy of the caudate nucleus, demyelinization of the anterior portion of the left pallidum with diffuse cellular alterations of a chronic regressive type. Status marmoratus of the thalamus was found bilaterally, demyelinization of the right lenticular ansa, and chronic regressive changes in the olivary nucleus. The authors lay special stress on the status marmoratus of the optic thalamus. The absence of changes in the liver and of signs of encephalitis suggest that their case was congenital in origin. (R. G. G.)

Multiple Tubercles in Brain.—The author describes a case in which the main symptoms were preceded by a hypersecretive hydrocephalus. After dealing with the pathogenic interpretation of single symptoms, the author insists on the necessity of always remembering the possibility of multiple tumours and that a serous tubercular meningitis taking the form of a hydrocephalus may be the alarm signal for a development of multiple tuberculomata whose localizing signs will only declare themselves later. (R. G. G.)

Use of Centrifuge in Lange Reaction.—The time taken in carrying out the tests is considerably reduced and their accuracy is not affected by the use of the centrifuge. (R. G. G.)

Interfascicular Oligodendroglia and Cells of Schwann.—These cells are more varied and more numerous in the adult than in the newborn. It is possible to find cells of the form of Schwann's cells especially in the fœtus and in the newborn. The function of secretion of myelin is probably confined to those cells resembling Schwann's cells, the other type seem to have the function of weaving together and support of the bundles of nerve fibres. The secretory function is, however, hypothetical and has never been demonstrated. The identity of the interfascicular oligodendroglia with the cells of Schwann has not been conclusively proved either, nor have the identity of other perimyelin and endomyelin structures. (R. G. G.)

SCHWEIZER ARCHIV FÜR NEUROLOGIE UND PSYCHIATRIE

Vol. 41. No. 2. 1938.

*Die Neurosen nach Schädeltraumen. (Neuroses after cranial injuries.) R. Brun. 269.
Les " Névroses " survenant après les Traumatismes Cranio-Cérébraux. Nécessité d'une Révision de la Question. (" Neuroses " resulting from cranio-cerebral injuries. Necessity for a revision of the problem.) G. de Morsier. 359.
*Étude sur les Névroses Consécutives aux Traumatismes Crâniens. (Study of the neuroses due to cranial injuries.) F. Naville. 382.
Le Problème de la Causalité dans la Névrose Traumatiques. (Problem of causality in traumatic neuroses.) W. Riese. 410.
Über die soziale Auswirkung der Begutachtung von Schädel- und Gehirnverletzten. (Social effects of the medical report in patients with cranial and cerebral trauma.) H. Meier-Müller. 423.
Die Neurosen nach Schädeltraumen im Lichte der Theorien von Janet. (Neuroses after cranial injuries from the point of view of Janet's theory.) L. Schwartz. 433.
Eigener Selbstbericht über einem Autounfall mit Kommotio und die Folgen bis zum Abklingen der Symptome. (Personal experiences during a car accident causing concussion, and the continuation of the illness until the final disappearance of symptoms.) M. Tramer. 443.
Selbstbeobachtungen bei einer Commotio cerebri mit negativem Symptomenkomplex. (Personal experiences during cerebral concussion with negative symptoms.) E. Frey. 447.
*Le Postureomètre. Méthode d'Exploration du Système Nerveux Central. Son Utilité dans l'Examen des Commotionnés Cérébraux. (The postureometer. A method of neurological exploration and its practical value.) H. Brandt and H. Bersot. 451.
Beitrag sur Frage der traumatischen Epilepsie. (The problem of traumatic epilepsy.) E. Katzenstein-Sutro. 458.
Die diagnostische Bedeutung der Druckbestimmung in den Netzhautgefässen nach Schädeltraumen.

(Diagnostic value of measuring pressure of the retinal vessels after cranial trauma.) F. Rintelen. 479.

Deux Cas de Traumatisme Cérébral et leur Examen Histologique. (The histological examination of two cases of cerebral trauma.) F. Morel. 484.

Le Refroidissement Local et ses Conséquences en Neurochirurgie. (Local chill and its consequences in neuro-surgery.) H. Paschoud. 486.

This number reports the proceedings of the 44th Swiss Neurological Congress in Lucerne, November, 1937, which was devoted to post-traumatic neurosis. The following papers were of especial interest :

R. Brun.—Brun gives a critical survey of the subject with special consideration to the differential diagnosis between organic and psychogenetic sequelæ of cranial trauma, and to compensation neuroses. Dealing with the legal aspect of the latter, he refers particularly to Swiss law and insurance technique. The comprehensive bibliography, however, seems indispensable for everyone interested in the subject.

F. Naville.—It is shown from case histories that post-traumatic neuroses can be classified according to their predominant symptoms : (1) those with unco-ordinated involuntary movements ; (2) those with permanent and obsessive memories of the traumatic situation itself ; (3) those with general psychasthenic symptoms (phobia, insomnia) ; (4) emotional neuroses with predominantly visceral symptoms ; (5) true psychogenetic psychoses.

H. Brandt and H. Bersot.—An apparatus is described by means of which the modifications of posture reflexes in normal and pathological human subjects can be registered graphically. (K. S.)

Vol. 42. No. 1. 1938.

Little'sche Krankheit und Epilepsie. (Little's disease and epilepsy.) M. Biro. 1.

*Individuelle Vorbehandlung zur kollektiven Arbeitstherapie bei schweren chronischen Schizophrenen. (Preparation for occupational therapy in severe chronic cases of schizophrenia.) M. Boss. 15.

Die Wirkung des Insulins auf den normalen Organismus. (The effect of insulin on normal organisms.) J. Druey. 27.

*Nachuntersuchungen der in der Heilanstalt Burghölzli-Zürich von 1922–1934 mit Malaria behandelten Paralytiker. (Re-examination of patients with G.P.I. treated with malaria in the Mental Hospital, Zürich, 1922–34.) F. Escher. 37.

Von den Quellen der Querulanz. (Psychology of litigant paranoids.) A. Kielholz. 58.

*Tryptophanbestimmung im Liquor cerebro-spinalis und deren Ergebnisse. (Estimation of tryptophan in the c.s.f.) M. Kraus and K. Mezey. 77.

*Auftreten eines schizophrenen Schubes nach heftiger Gemütsbewegung. (Schizophrenia occurring after great emotional stress.) R. Mayer. 88.

Büchner's " Lenz." (Büchner's " Lenz.") W. Moos. 97.

Ist die Hysterie eine Krankheit ? (Is hysteria a disease ?) M. Nachmansohn. 115.

*Zur Pathologie und Klinik der Orientierung. (Isolierte Orientierungsstörung im Raum infolge übergrossen, linksseitigen Stirnhirntumors.) (Pathology and clinical significance of orientation.) F. Pollak. 141.

Schizophrénie et Rémissions après Insulinothérapie. (Schizophrenia and remissions following insulin therapy.) M-L. Press. 165.

Contributions à l'Étude des Lois de l'Évolution du Cerveau Humain. (Contributions to the embryology of the human brain.) W. Riese. 187.

Partnertrieb. (Matrimonial tendencies.) M. Tramer. 199.

Occupational Therapy in Schizophrenia. The author describes a peculiar way of inducing patients in a severe state of schizophrenia to take up work again. They are first given toys which are somehow related to their individual infantile attitude. From play they are gradually led to work. The case histories have to be read in detail. (K. S.)

G.P.I. Patients Treated with Malaria.—134 of the 296 patients treated during the period under consideration died, 16 showed at the time of re-examination a state of full recovery, 81 showed partial recovery, 58 were unimproved, and of seven the fate was unknown. It is demonstrated that the success of the therapy depends largely on the duration of the disease previous to the therapy. The lues reactions in the c.s.f. give a good impression of the success or failure of the treatment. The lues reactions in the blood are insignificant from this point of view. (K. S.)

Estimation of Tryptophan in C.S.F.—A simple method is described to estimate tryptophan in the c.s.f. The reaction was positive in luetic diseases of the c.n.s. It was negative in cases of syphilis which had come to a standstill and in which the other reactions were also negative, or in normal cases. (K. S.)

Schizophrenia after Emotional Stress.—Immediately following an acute outbreak of schizophrenia in a patient of 23 years both his parents developed schizophrenia. Both parents had cases of mental disease in their family tree. (K. S.)

Pathology of Orientation.—A patient with a large left frontal lobe tumour showed a peculiar lack of orientation in space. The sense of spatial relation, especially " right and left " and " above and below " was disturbed, including the patient's own body. She could, for instance, promptly point at mouth, sternum, umbilicus, or abdomen, but not to right or left hand, etc. The phenomenon was analysed from the point of view of its psychology and localization. (K. S.)

ZEITSCHRIFT FÜR DIE GESAMTE NEUROLOGIE UND PSYCHIATRIE

Vol. 163. No. 1. July 1938.

*Zur Erbpathologie des manisch-depressiven Irreseins. Die Eltern und Kinder von Manisch-Depressiven. (The heredity of manic-depressive insanity. The parents and children of manic-depressives.) E. Slater. 1.
Krankheit und Tod des paranoischen Massenmörders Hauptlehrer Wagner. Eine Epikrise. (The illness and death of the mass-murderer, headmaster Wagner.) R. Gaupp. 48.
Zur Frage der akuten multiplen Sklerose. (The question of acute multiple sclerosis.) H. Kreissel. 83.
Das Zeichnen einer Patientin mit totaler Aphasie. (Drawing in a patient with total aphasia.) A. A. Boon and P. Feitscher. 103.
*Apoplektiformer Krankheitsbeginn bei Hirntumoren (Halbseitenlähmung). (Apoplectic onset in brain tumours (hemiplegic).) A. Stender. 123.

Heredity of Manic-Depressive Insanity.—The mental history of parents and children of a group of manic-depressives was studied. A high incidence of death from arteriopathic diseases was found. There was no evidence of social deterioration in the groups. Manic-depressive psychoses were present in 11·5 per cent. of parents and in 22·2 per cent. of children; if doubtful cases and suicides were counted the figures were higher. Schizophrenic disorders formed a small proportion.

Apoplectic Onset in Brain Tumours.—This paper discusses the sudden apoplectic onset in cases later found to suffer from a brain tumour. Twelve personal cases are described, hemiplegia and hemianæsthesia are usual, often accompanied by hemianopsia or aphasia. Pressure symptoms, as papilleodema, were usually absent. Death ensued fairly rapidly in most cases. The tumour was found to be a glioblastoma multiforme in five cases, the others varied. The mechanism of the onset was discussed. In most cases a marked œdema of the brain was present and this is considered to have a bearing on the acute onset.

Vol. 163. Nos. 2 and 3. August 1938.

XVIII. Bericht über die Deutsche Forschungsanstalt für Psychiatrie, Kaiser Wilhelm-Institut in München. (Bericht über die Zeit vom 1. April 1937 bis 1. April 1938.) (18th report from the German research institute in psychiatry, Kaiser-Wilhelm-Institut, Munich. (Report from 1st April, 1937, to 1st April, 1938.) 169.
*Der Status marmoratus, ein Beispiel systemähnlicher Hirnveränderungen auf der Grundlage von Kreislaufstörungen. (Statusz. Marmoratus, an example of a system-like brain disorder on a basis of circulatory disturbance.) W. Scholz, J. Wake, and G. Peters. 193.
Über einige Sonderformen des "Angeborenen Schwachsinns." (Klinischer und erbbiologischer Beitrag zur Kenntnis der kongenitalen Wortblindheit und Worttaubheit, der Hörstörungen bei Schwachsinnigen und der xerodermischen Idiotie). (Unusual forms of congenital feeblemindedness.) (A clinical and hereditary contribution on congenital word-blindness and word-deafness, on disturbances of hearing in the feebleminded and on xerodermic idiocy.) F. Laubenthal. 233.
Über Syringomyelie und Teratombildung im Rückenmark (Syringomyelia and teratoma formation in the spinal cord.) W. Voss. 289.
Die erst bekannte akademische Sondervorlesung über Neurologie. (Anlässlich der 200 Wiederkehr des Todestages Herman Boerhaaves (23. Sept. 1738).) (The first known separate academic lecture on neurology. Commemorating the 200th anniversary of the death of Herman Boerhaave, died 23rd September, 1738.) W. Creutz. 299.
*Insulinvergiftung. I. Klinische und pathophysiologische Beschreibung. (Insulin poisoning. I. Clinical and pathophysiological aspects.) G. W. Kastein. 322.
Insulinvergiftung. II. Neurologische und anatomisch-histologische Beschreibung. (Insulin poisoning. II. Neurological and histological aspects.) G. W. Kastein. 342.
Epilepsia partialis continua bei Läsion des Stirnhirnes und des Thalamus opticus. (Epilepsia partialis continua from a lesion of the frontal lobe and optic thalamus.) R. Kautsky and E. Stengel. 362.
Zur Klinik und Anatomie der nach dem Typus der Landryschen Paralyse verlaufenden Polyganglio-Radiculo-Neuritis. (The clinical aspects and anatomy of paralysis of the Landry type following polyganglio-radiculo-neuritis.) G. Peters and W. Scheid. 367.
Übe einen zur Gruppe der Myoklonusepilepsie gehörenden Erkrankungsfall. (A malady belonging to the group of myoclonus epilepsy.) H. Buduls and J. Vilde. 382.
Haben gynäkologische Erkrankungen eine Bedeutung für die Genese des Mongolismus? (Have gynæcological disorders any bearing on the genesis of mongolism?) H. Schröder. 390.
Über Liquorveränderungen nach der Lumbalpunktion. Zugleich ein Beitrag zur Frage der postpunktionellen Symtome. (Changes in cerebrospinal fluid after lumbar puncture. Also a contribution to the question of post-puncture symptoms.) W. Scheid. 397.
Temporo-occipitale Jackson-Epilepsy. (Temporo-occipital Jacksonian epilepsy.) K. v. Säntha. 432.

Status Marmoratus.—In this paper eight cases showing status marmoratus of the putamen are described in detail, and other cases from the literature are discussed. From the early history of fits, fever, etc., in most cases; from the histological appearances and the nature of the involvement of other regions, it is concluded that status marmoratus is not an inborn developmental defect, but the result of circulatory disturbances. The symptomatology is not uniform, there is usually disturbance of locomotion with athetosis, etc., speech defect, and often mental defect, but these findings are not invariable.

Insulin Poisoning.—A schizophrenic woman treated by insulin injections fell into coma after her 60th treatment and remained in it till her death 20 days later. She had had prolonged coma on previous occasions. Studies of the blood sugar were made under varying conditions and it was found peculiarly labile. Lumbar puncture did not relieve the coma. At autopsy the pituitary was found enlarged with abnormal vascularity and excess eosinophils. The islands of Langerhans in the pancreas were

increased in size and number. In various parts of the brain, especially the cortex Sommer sector and striatum, were ischæmic infarcts, cell outfall and increased vascularity. There was general congestion. The theories of insulin action are discussed, especially the relative importance of the toxic and vascular factors.

Vol. 163. No. 4. September 1938.

Die Katatonie auf Grund katamnestischer Untersuchungen. II Teil. Die Erblichkeit der eigentlichen Katatonie. (Katatonia from the view point of catamnestic researches. II. The heredity of pure katatonia.) H. Schwab. 441.

Studien über Temperatur, Blutbild und Senkungsgeschwindigkeit der roten Blutkörperchen bei Sulfosinbehandlung, speziell bei Psychosen. (Studies in temperature, blood picture and sedimentation rate of the red blood corpuscles during treatment with Sulfosin, especially in psychoses.) I. Blomqvist. 507.

*Kritische Bemerkungen zu der Methode von Słonimski und Cunge. (Critical observations on the method of Słonimski and Cunge.) J. Dretler. 542.

Studien über den Vitamin-C-Gehalt im Liquor cerebrospinalis. VI Mitteilung. Über den Übergang des Vitamin C in den Liquor cerebrospinalis. (Studies in the vitamin C content of the cerebrospinal fluid, Part 6. The fate of vitamin C in the cerebrospinal fluid.) M. Kasahara and I. Gammo. 551.

Bemerkenswerte postencephalitische Hyperkinesen. (Remarkable postencephalitic hyperkinesis.) F. Duensing. 554.

Ausgedehnte Entwicklungsstörung der Grosshirnrinde als unerwarteter Sektionsbefund. (Extensive developmental derangement of the cerebral cortex as an unexpected autopsy finding.) V. Nicolajev. 565.

Über die sogenannte "Religiöse Kurve. Nochmals ein kritischer Beitrag. (The so-called "religious curve." Another critical contribution.) L. Klages. 575.

Stellungnahme zum vorstehenden Aufsatz von L. Klages. (A rejoinder to the preceding paper by L. Klages.) G. Kloos. 583.

Critical Observations on Method of Słonimski and Cunge.—A study of agonal and postmortem changes in the blood vessels was made by the Benzidin perhydrol method. Animal brains were examined at varying intervals after death. The changes varied with the size of the vessel and their fulness. Red corpuscles wander out of the vessels, soon after death, till there is hæmolysis. In man the post-mortem changes had begun about three hours after death.

ZENTRALBLATT FÜR NEUROCHIRURGIE

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*Zur Kenntnis des Diabetes insipidus. (Diabetes Insipidus.) M. Balado. 257.

*Neuere Anschauungen zur Pathophysiologie der Liquorzirkulation. (New Views on the pathophysiology of cerebrospinal fluid circulation.) G. Schaltenbrand. 290.

*Die Lage-abweichungen der vorden Hirnarterie im Gehässbild. (The deviations of the anterior cerebral artery as seen in the angiogram.) E. Fischer. 300.

*Über stereoskopische Arterieogramme der Carotis interna. (Stereoscopic arteriograms of the internal carotid artery.) G. Häussler. 313.

Diabetes Insipidus.—This paper is based on detailed anatomical studies of the pituitary stalk and its connections. The current view of the nervous structure of the stalk is criticized by the author who finds that perivascular follicles surrounded by well-defined fibrous capsules form the chief structural components of the pituitary stalk. No evidence of secretory channels in the sense of Herring, Cushing *et al.* could be found and Balado assumes that the stalk functions as a gland and not as a pathway for the secretions of the anterior and middle lobes. He is also unable to verify the existence of a thick bundle of non-myelinated fibres which has been described by a number of authors and believes that the structures so described are in reality composed of glial fibres. A number of myelinated fibres were, however, found, but the small number of such fibres makes it improbable that these represent connections between the supra-optic nuclei which contain 140,000 cells and the stalk which according to the author contains only 5,500 fibres. Degeneration experiments and histological evidence from human post-mortem material furnish further support for the author's denial of such connections. A case of diabetes insipidus due to a supra-sellar tumour is described and the diagnosis discussed. In the author's opinion diabetes insipidus is caused by a lesion of the glandular elements of the stalk which are responsible for the production of Adiuretin, but at the same time the anterior lobe must not be completely destroyed, for this lobe elaborates a substance which promotes diuresis and appears essential for the appearance of the syndrome. Lesions of the tuberal region or of the myelinated fibres contained in the ventral part of the stalk may also cause diabetes insipidus. (G. J.)

Pathophysiology of C.S.F. Circulation.—The high albumen content of cerebrospinal fluid found in various conditions is usually explained as being due to transudation from congested veins and as being directly derived from neoplastic tissue. In many instances, however, this theory is found to be unsatisfactory and Schaltenbrand believes that the velocity of the liquor circulation, a factor which has so far been neglected, plays an important role in determining the chemical composition of the fluid. A model

experiment illustrates what happens when water is made to circulate through a semi-permeable tube which again is surrounded by ink. The concentration of ink in the circulating water will depend on the velocity of the circulation. The rate of production and absorption of cerebrospinal fluid will have an important effect on the concentration of albumen and of lipoids in the fluid. This conception explains the composition of the liquor in various conditions and has lead the author to recognize such clinical states as liquorrhœa and aliquorrhœa. The latter produces intracranial hypotension and may in elderly subjects be the cause of the so-called hæmorrhagic pachymengitis. Liquorrhœa would express itself in a high pressure of cerebrospinal fluid which would be relatively poor in albumen and lipoids. The therapeutic importance of this view is stressed and some illustrative cases are described. (G. J.)

Deviations of Anterior Cerebral Artery.—The German school of neurosurgeons attaches supreme importance to the antero-posterior view in the evaluation of angiograms. In the present article the effects of local and remote pressure on the course of the anterior cerebral artery are analysed in detail. Remote pressure will produce a shift of the vertical portion (in the A.P. view) of the artery whilst the tethering of the vessel by its branches will give this portion a wavy outline. This happens particularly at the site of origin of the frontopolar artery giving rise to an angulation of the vessel, the so-called frontopolar sign. Another such angulation may be produced by the free margin of the falx, the "falx-sign." The effects of tumours in various situations are described and illustrated with very helpful diagrams. (G. J.)

BOOK REVIEWS

THE PITUITARY GLAND

From the Proceedings of the Association for Research in Nervous and Mental Disease

(Williams and Wilkins, Baltimore. 1938. 45*s*.)

In all 42 papers are presented which deal with the anatomy and physiology of the gland and certain clinical aspects associated with dysfunction of the gland. Medical men who are interested in this subject will find this book valuable, as the survey of the subject is a wide one. It is to be hoped that further volumes of this series may reach the public at an earlier date after the meeting at which the papers are presented. The lapse of 21 months between the presentation of a paper and its publication is a long one, and the acquisition of new knowledge during these months may render a paper out of date.

CAUSES OF CRIME

Arthur E. Fink

(Oxford University Press, Sir Humphrey Milford. 1938. 14*s*.)

Most of the best-known sources of information dealing with the etiology of crime and its associated problems are of European origin. The author has here presented an account of the American contributions to this subject, issued during the period 1800–1915. The resulting monograph is a very thoughtful and detailed presentation of the studies, prosecuted more especially along anatomical, psychological, and genetic channels. All students of criminology will value this work and appreciate the author's painstaking and meticulously documented compilation. Its sole drawbacks are to be found in the self-imposed limitations of the work.

ÜBER SINN UND SINNLOSIGKEIT DES LEBENS (*Sense and Senselessness of Life*)

M. v. Andics

(Gerold & Co., Vienna. 1938)

This is a report on 100 cases of attempted suicide admitted to the Vienna Psychiatric Hospital. Experiences important for the development of the individual and especially for the motivation of the final catastrophe are pointed out statistically and in case reports. Environmental factors during childhood, health and disease, loneliness and friendship, financial and professional position, sex, marriage and family, form the background of the tragedy. These things, however, are known to the reader before he starts on the subject, and beyond their enumeration he will find very little which will help to solve this urgent social and ethical problem.

ZUR MEDIZINISCHEN PSYCHOLOGIE UND PHILOSOPHISCHEN ANTHROPOLOGIE (*Medical Psychology and Philosophical Anthropology*)

A. Gelb

(From the *Acta Psychologica*, **3**, 2, 193. 1937)

The psychologist A. Gelb, known to neurological readers by his work in collaboration with Goldstein, gave these lectures in the University of Lund a short time before his death. He summarizes in a most impressive and brilliant way his results of psychological analyses of pathological cases such as aphasic and agnostic. Here one feels more than ever that though " neuronal " and schematic conceptions of focal disorders of the cortex are sufficient for practical diagnostic purposes, they are unsatisfying and misleading from the psychological point of view. To anyone who recognizes this discrepancy and yet distrusts hypotheses and mere conjecture, Gelb's lectures must be most valuable. He never leaves the basis of fact and observation, and opens new and interesting aspects to the reader accustomed to think in purely " organic " terms. A fundamental influence of Bergson's philosophy is distinctly recognizable. This does not diminish the impression of Gelb's great originality.

HUMAN UNDERSTANDING AND ITS WORLD. A Study of Societies

K. W. Monserrat

(University Press, Liverpool. Hodder and Stoughton, London. 1937. 15*s*.)

The author of this ambitious philosophical work is a well-known Liverpool surgeon. Wide historical and scientific knowledge provides his sources ; his method is somewhat reminiscent of that of Comte. The ground covered is so vast and the style so abstruse and difficult that a brief statement of his aim and conclusions is impossible. Man is viewed as an image-forming being and an organization of powers : the final argument deals with the relationship through science of sequences in the world—or, rather, in his image of the world—which manifest the interaction of energy-units or powers. The work, which includes many interesting reflections on neural activity, is thoughtful and learned.

AN INTRODUCTION TO ABNORMAL PSYCHOLOGY

V. E. Fisher

(Macmillan, New York. 1937. Revised Edition. 12*s*. 6*d*.)

This book shows very little familiarity with the clinical problem of mental abnormality : simple and sweeping psychological explanations are put forward with out-moded confidence, and the complexities and medical aspects of psychiatry are ignored. How misleading such a presentation can be is illustrated in the chapter on mental hygiene, where it is stated, à propos of " many of the insanities, epilepsy, psychopathic personality, often the more severe cases of psychoneurosis . . . criminality, indolence, sexual perversions, and prostitution," that " most of these conditions could be prevented through the proper management of the individual's development during the first eight or ten years of life." Statements of this kind are in keeping with the lack of definite evidence and proof which is often manifest in wholly psychological presentations of psychiatry. The present work is not, however, in the main extravagant ; allowing for the limitation of its " eclectic " approach, it is consistent and well written.

AMERICAN MEDICINE : EXPERT TESTIMONY OUT OF COURT

(The American Foundation, New York. 1937. 2 Vols. $3.50 (16*s*.))

The service rendered by the American Foundation in reviewing the problems of medicine in the United States will be appreciated in other countries, such as Great Britain, where there are essentially the same issues, though on a smaller scale. The method employed has been to ask some 2,000 doctors, representative of the whole profession, to state whether they considered radical reorganization of medical care was called for, and on what lines ; or, if they thought less drastic measures would suffice, what changes they would advocate. The replies have been sorted and arranged, with comment, in two bulky and most informative volumes, from which the reader can get an impartial view of the situation. Medicine, as a social activity, is surveyed in all its aspects : there are eleven chapters dealing with such topics as the education of doctors, group practice, specialization, the place of the hospital, state medicine, and health insurance. It is the very wide range of considered opinions on these lines that gives the survey its peculiar value. In the views incidentally expressed as to the place of psychiatry in medical training and practice there is the usual scale, with enthusiasm at one extreme and exasperation at the other, but most of the contributors who write on the matter are moderate, and well aware of the desirability of seeing that this subject, indisputably important and indisputably unsettled, becomes both more teachable and better taught.

THE EMOTIONAL FACTOR IN VISCERAL DISEASE

H. G. McGregor. With a foreword by R. D. Gillespie

(Oxford University Press, London. 1938. 8*s*. 6*d*.)

This book can be recommended to medical men as a good introduction to the study of the effects of psychological factors upon bodily functions. Numerous references are given for the reader who wishes to gain a better knowledge of the subject. The author gives a clear and concise account of a difficult subject. The chapter on the autonomic nervous system might have been expanded with profit, and it would have assisted the reader if it had been placed at the beginning of the book.